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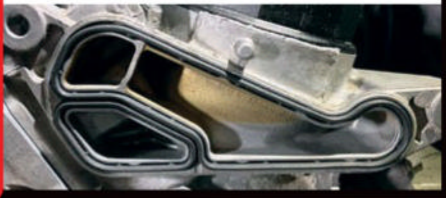

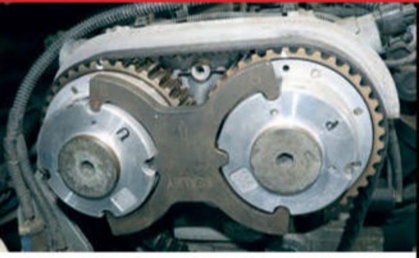

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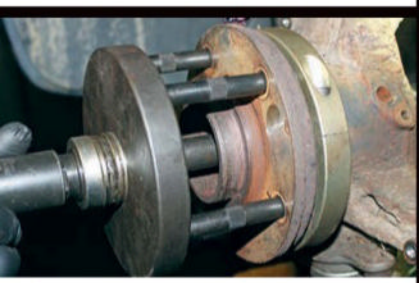

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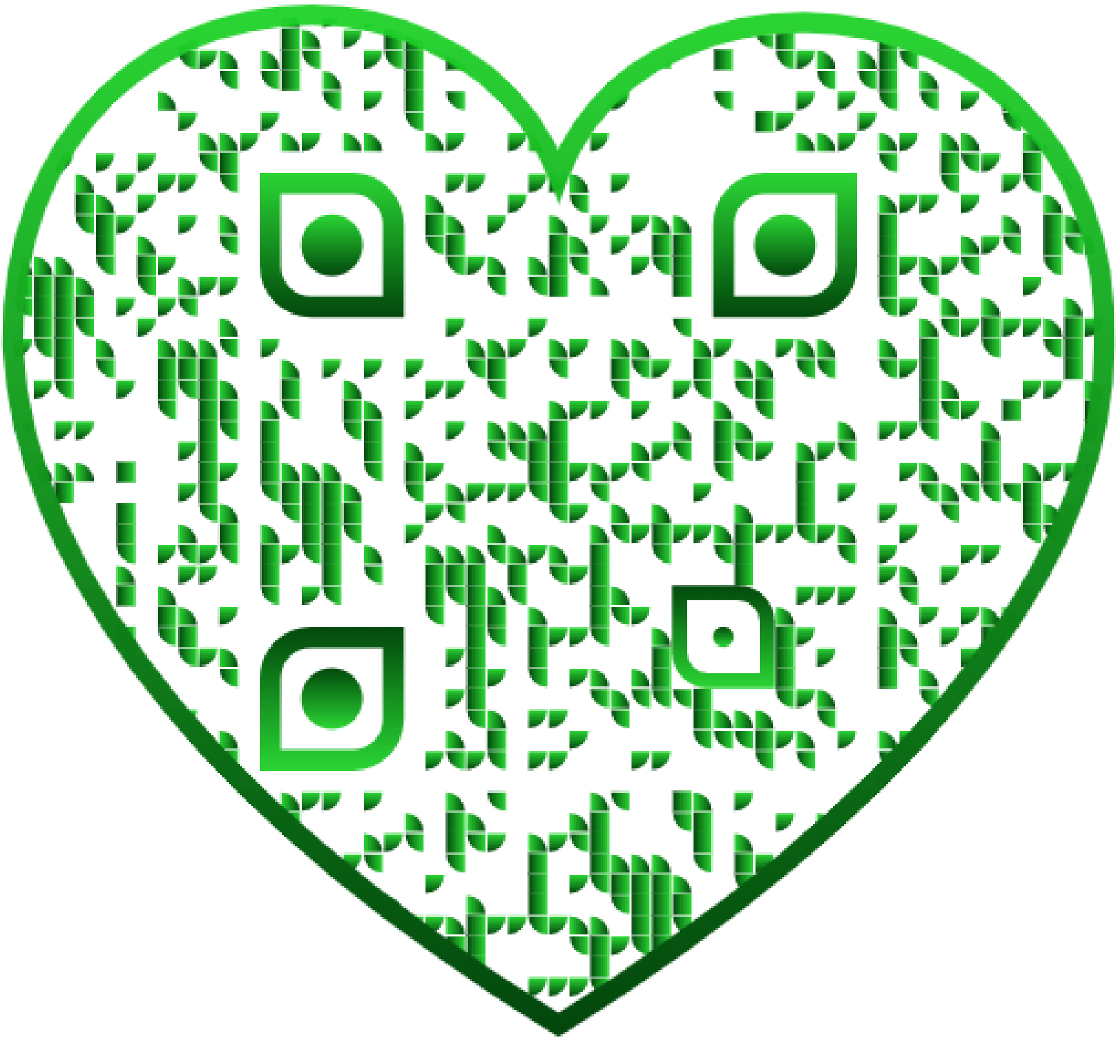

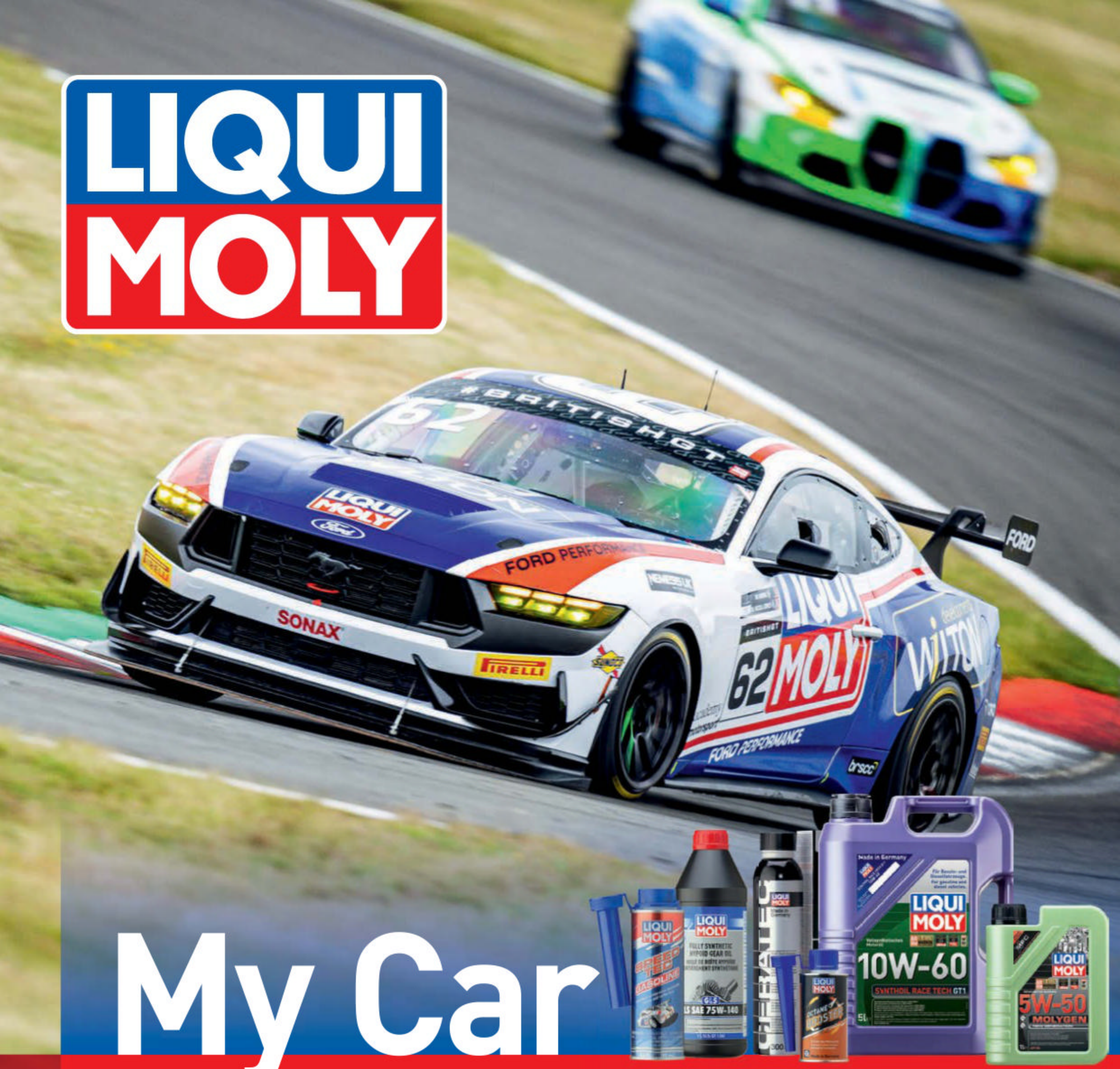

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BEV updates

November was a sad moment for the UK car industry. First Ford announced 800 job losses in the UK, then Stellantis said Vauxhall's Luton factory is to close with a potential 1100 jobs at risk.

Most carmakers are in a difficult place. They are making more Battery Electric Vehicles (BEV) models, alongside diesel, petrol and hybrids. What's wrong with that you may ask. Well, the strict sales targets on BEVs aren't helping – manufacturers are struggling to sell their annual quota of BEVs – and are then fined by the Government up to £15,000 per unsold vehicle, for failing to meet the Zero Emission Vehicle (ZEV) mandate. Which, to me and you, doesn't sound like good business strategy.

Talking of BEVs – our *Instant Expert* feature this month (page 6) contains something we've not touched on in great detail in *CM* before. We might not all agree that electric power will be a viable replacement for the internal combustion engine, but as BEVs are here, we need to keep on top of the latest technology, otherwise we, as a magazine, will be left behind. Writer Rob Marshall did say to me, and I quote, "It was a tricky one to do but great fun and hugely educational".

Something else caused a stir in November. Jaguar released news of a reset in its business – a rebrand. First came a video on November 19th. A strange video to many – it contained no cars, just people. Then a few days later, pictures of a concept car emerged. Over in Miami another video was produced, presented by Jaguar's Chief Creative Officer, Professor Gerry McGovern OBE. He introduced two examples of the Jaguar Type 00 concept luxury electric vehicle for the future of Jaguar – a new design philosophy it was called. One model was shown in London Blue and the other Miami Pink – with a pink background. Jaguar were certainly trying to grab our attention.

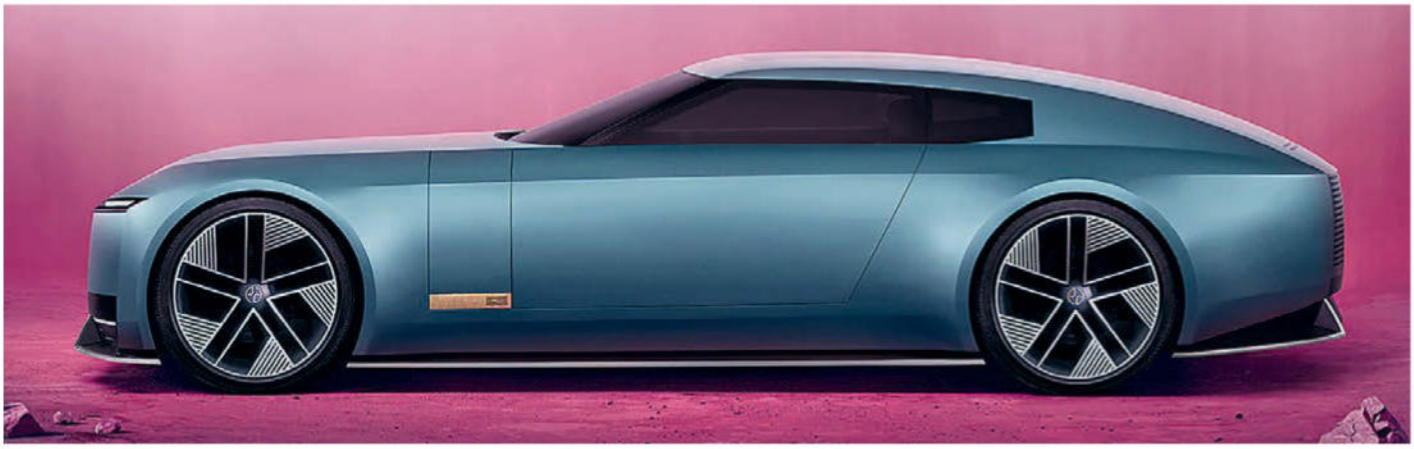
Much talk on social media ridiculed the rebrand. For me though, I think the new concept is fantastic. Jaguar have certainly put a lot of effort into the design (inside and out). I see it as a modern version of the 1960s E-type. At least it looks different to all those bland SUV BEVs we see driving on our roads. Jaguar are taking orders in mid-2025 with cars on the road in 2026.

We will have to wait to then to see if Type 00 looks anything like the road-going built car – I do hope so.

Season's Greetings

On behalf of all the writers at *CM* – and myself – we'd like to wish you a very Merry Christmas and a prosperous New Year!

Thank you for your support during 2024. If you are tinkering with cars over the festive period, do write to me at the above email. Or maybe you have received an amusing or interesting gift you can share with us here at *CM*. We do hope to see you all in 2025...



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We are sorry, but apart from material sent to *Help!* or *Diagnostics Doctor*, not all correspondence can be replied to personally, though everything is read carefully. Emails will be treated in the same way as ordinary mail – the editor is not normally available to provide instant replies.

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The Peter Simpson COLUMN

While he was away getting married, Peter had the timing chain changed on the family's Sorento, a job which prompted a few thoughts on short chains, long chains, dry belts and wet belts…

▶ While Sarah and I were getting married in October, we took advantage of being away to have our Kia Sorento's timing chain changed – the full story will, of course, be coming up as a full feature in due course. The Sorento is the Simpson family's primary frontline car, used pretty-much daily, and being without it for the couple of days that this job was likely to take would, under normal circumstances, have been somewhat awkward.

The other reason for not doing the job until now was that I wasn't 100% certain the chain needed changing. The only symptom was a rattle for 2-3 seconds on cold startup which sounded like it could equally be hydraulic tappets filling up. Or maybe that was wishful thinking on my part. But then again on the 'nothing wrong' side, our previous Sorento made exactly the same noise on startup. Getting reliable information on whether this was a symptom of chain wear or a "they all do it sir" type of issue also proved difficult, as there isn't a massive amount about them online.

Now, though, I know that the chain was worn, because with a new chain kit fitted, the noise has gone. The actual source of the noise, so I'm told, is that when the chain is worn, the hydraulic chain tensioners have to extend to their maximum, and while this is happening, the chain isn't properly tensioned for a few seconds. And during that time, it rattles.

The total cost, including parts, labour, VAT and an engine oil change which is essential after a job like this, came to a smidgen over £1000. So not cheap, but given that the car had done 106,000 miles, and this seems to be the only significant weak-spot of the Kia/Hyundai 2.2 diesel, a worthwhile investment I think, and I need to thank Dan, Lisa and the rest of the team at Sleaford-based Hedaux Motor Company (01529 421800) for both a job well done and for taking photos of all the key stages as they went along.

Having this work done has, however, started me thinking a bit about timing chains and belts in general, and the way in which valve timing technology has changed and developed. In the early days of overhead valve engines, the camshaft was half-way up the block, meaning the chain's run was often too short to need a separate tensioner. In any case, a bit of chain rattle was basically par for the course once an engine had gone over 60-70k, and most people just lived with it. Sometimes there wasn't a chain at all; the drive between the crankshaft and cam was by cogs – a small one on the crank and a larger one on the cam. This means that the camshaft turns in the opposite direction to the crank.

Then, when overhead camshaft engines became the norm, the timing chain's run became much longer; it now had to connect the crankshaft at the bottom of the engine with a camshaft at the top. Accurate timing also became more important as engines were required to be more powerful and fuel-efficient, and the timing belt was introduced as a response to this. Contrary to popular opinion, timing belts were not part of some huge conspiracy among manufacturers to limit the life of engines, they were devised to solve a specific problem.

As with most new technologies there were teething troubles. Specifically, it took the trade time to understand that timing belts not only had to be changed on time, but that a timing belt's tension was also rather more critical than on a fanbelt. It also required manufacturers to devise methods of setting the tension which could be used in an aftermarket environment.

Eventually, however, all this was sorted, and as a result timing belt change intervals could be extended past the typical three-year 36,000 miles of the 1980s to today, when it's not unusual for manufacturers to claim ten-year/100,000-mile intervals.

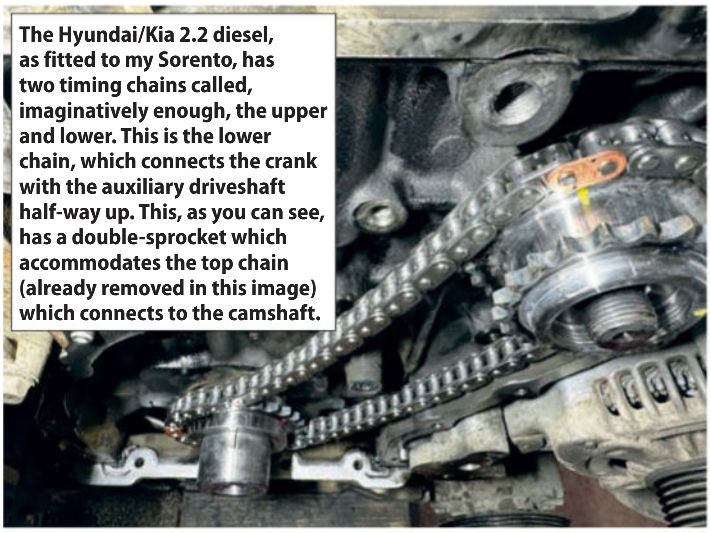
However, from the mid-1990s, some manufacturers started using chains again, on the basis that modern lubricants plus improved manufacturing techniques, made possible a chain long enough to operate an overhead cam but which would also last as long as the rest of the engine. And of course, this was more desirable than a belt that needed routine renewal even at long intervals. Sometimes this worked, but in other cases it did not, timing chain rattle and failure became a known problem, and routine renewal was recommended.

Just one problem – by and large these engines hadn't been designed for a timing chain to be changed part-way through their lives, and in many cases doing so is a major task. Engine-out isn't unusual, and the worst I've come across is the old 2.8 VW engine as used in various fast VWs and the original VW Sharan/Ford Galaxy family. On this, the timing chain is on the gearbox end of the engine, meaning the engine and gearbox both have to come out, and be split on the workshop floor, before the chain can be changed. And yes, they frequently failed at around 100-110k if not renewed, and this caused massive engine damage!

Thankfully, our Sorento seems to have been designed in anticipation that the chain might need to be renewed part-way through the engine's life, and the job isn't massively more difficult than changing a belt would be, other than there being two chains and the need to drop the oil sump.

The most recent development in this direction is of course the infamous 'wet belt' – a timing belt which runs through the engine oil to provide lubrication and, like the chain, was intended to be a component which lasts the life of the engine. Except that, as we know, it doesn't. Rather bits generally start to break off as a wet-belt ages. They then float around in the oil, and eventually clog up something which should not be clogged, resulting in major engine failure. The only real way of countering this is to keep totally on top of routine oil changes and change the belt before it begins to shred – something which, just like some second-generation timing chains, the manufacturers neither envisaged nor made much provision for.

In normal circumstances, I'd be saying that these weaknesses would, in time, be designed out of wet belts. But I really can't see the internal combustion engine being around long enough for any next stage in valve timing technology to become a reality.

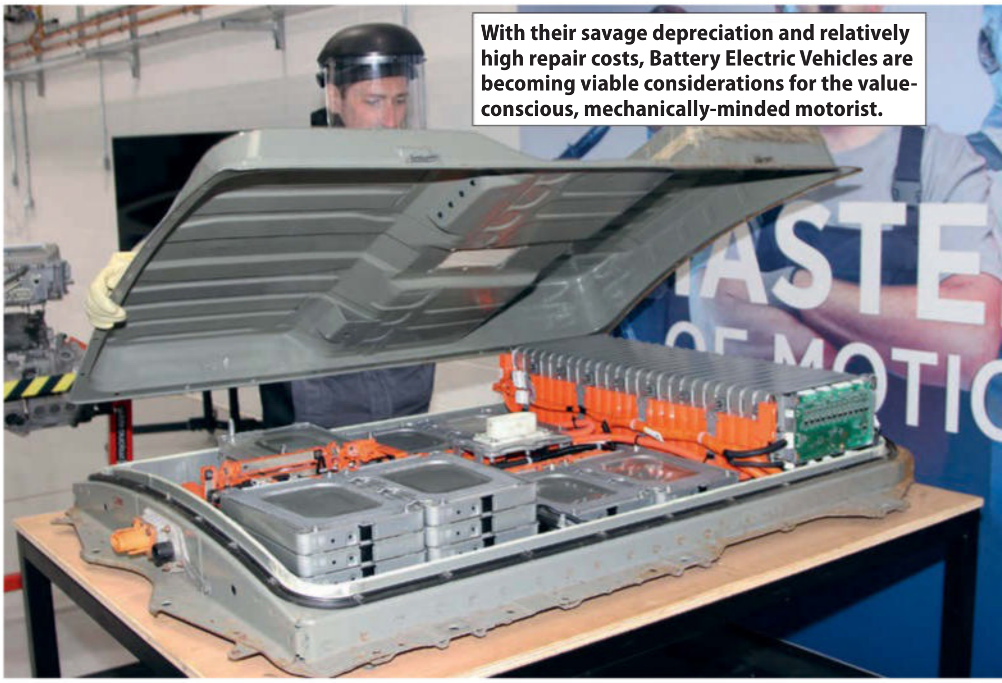


The Hyundai/Kia 2.2 diesel, as fitted to my Sorento, has two timing chains called, imaginatively enough, the upper and lower. This is the lower chain, which connects the crank with the auxiliary driveshaft half-way up. This, as you can see, has a double-sprocket which accommodates the top chain (already removed in this image) which connects to the camshaft.

INSTANT EXPERT

Battery Electric Vehicles (BEVs)

Is going electric worthwhile for the value-orientated DIYer? You bet it is! **Rob Marshall** looks at how Battery Electric Vehicles differ from conventional wisdom.


With their savage depreciation and relatively high repair costs, Battery Electric Vehicles are becoming viable considerations for the value-conscious, mechanically-minded motorist.

Few automotive developments have been as divisive as the battery electric vehicle (BEV). Should car writers review them, reader feedback is rarely balanced. If the journalists heap praise, they tend to be accused of being sops. Should BEVs be criticised, the haters paint them as Luddites. The topic is not helped by being intertwined with politics. The UK government's intent to 'ban' pure combustion-engined cars is being viewed, albeit not entirely unreasonably, as forcing zero-emission vehicles onto a market that is not ready for them. Then, there is the huge question about the public charging infrastructure, let alone concerns about BEV's environmental credentials, when manufacturing and disposal are considered.

Delphi Technologies
ELECTRIC VEHICLE
BRAKE PADS

Brake noise tends to be more noticeable on BEVs, owing to the lack of a combustion engine. Regenerative braking also means that the braking system experiences lower temperatures. Therefore, BEV-specific brake pads are formulated for optimum performance and comfort under these conditions.

"We see this scepticism among professional technicians, who enrol in our electric vehicle courses every day", admits David Guilfoyle, Technical Services Engineer at Delphi, who is our guide around the modern BEV. He cites that the most popular critique surrounds the sometimes questionable means by which raw materials are extracted for the batteries and motors. All of these considerations are valid but there is little that a technically-minded used car buyer can do about them.

BEV honeymoon hits the skids

The UK BEV market situation is fascinating. While the British Government offered little relative support to private buyers, a dedicated group of enthusiastic early adopters bought into the technology, some of whom have been eulogising about it ever since. While the reputational boost of 'going green' is attractive to businesses, their fleets were (and remain) more interested in the considerable taxation perks.

Yet, the conservative nature of the motorcar market has made the trade very distrustful of unproven technology. Ultimately, the market sets the price. Now that businesses are de-fleeting their battery electric vehicles, they are finding precious few private buyers clamouring for them. Now, they are paying the price. Toppling BEV values have been blamed for denting the profitably of several well-known companies. We have also heard of main dealers refusing to part-exchange fully electric cars that they sold new several years previously.

While electric vehicle sceptics would, no doubt, be feeling a degree of schadenfreude, they should not be too smug. BEVs are not going away, despite uptake being below the levels required to meet the zero-emission vehicle mandate. For now, the UK government remains transfixed on a 2030 pure combustion engine ban (at the time of writing) but many carmakers are not just backtracking

WHAT IS A BATTERY ELECTRIC VEHICLE?

▶ A BEV is an electrified vehicle that relies purely on batteries, charged by an external source, for motive power. Confusingly, the term 'EV' can be used solely for BEVs. Yet, hybrid vehicles are also EVs, being electrified vehicles that possess a combustion engine in addition to a battery pack. In this feature, we consider BEVs, with occasional reference to high-voltage hybrids, including Plug-Ins (PHEVs), which can be driven in electric-only mode. The majority of mild-hybrids (MHEVs) are low-voltage vehicles, which cannot be propelled solely by electricity. Therefore, this feature does not consider them. Hybrid technology was considered in greater detail in our March 2024 issue.

on their ambitious targets but they also are selling BEVs at a loss to stimulate demand. Naturally, all of these considerations have depreciation implications.

Do not be blind to the "fantastic bargains"

These are not our words but those from the Director of Corporate Affairs at the British Retail and Leasing Association last summer, as he referred to used BEVs, while revealing that his members were having to stomach the depreciation bill. Therefore, should you be a BEV sceptic, it would be prudent to put aside any prejudices and consider that they comprise ~4% of all cars on UK roads. Four years ago, the figure was ~0.5%. While BEV sales are not growing as fast as the government wants, electricity is becoming a viable road 'fuel'.

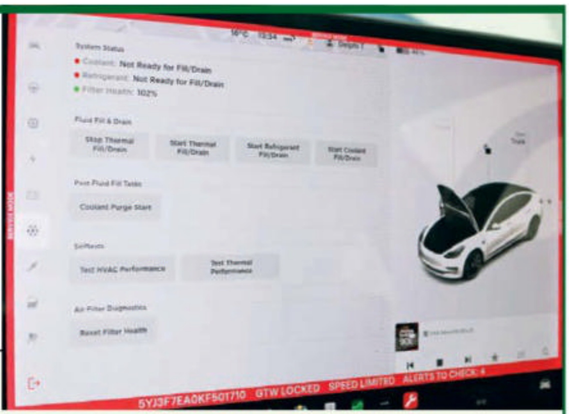
Consider if an electric car could work for you. Should you live near a city, or your commute comprises several miles, a BEV could make perfect sense. After all, short journeys are an anathema to combustion-engined cars – not only are they considerably less efficient but they also suffer from much higher wear levels, when cold.

Naturally, cheaper and older BEVs are less comfortable with lengthy, high-speed trips. Yet, as your budget increases, so too will battery capacity and, therefore, the range between charges. Whichever model you choose, try not to rely on the public charging network. For the lowest running costs, treat a BEV as a mobile 'phone: charge it from home.

You should also factor how the repair trade has reacted to BEVs. Most aftermarket garages remain extremely busy maintaining fossil-fuelled vehicles, especially as motorists are holding onto their cars for longer. Garages also have to invest in tools and training for electric vehicles, which is hard to justify, when other technologies (Advanced Driver Assistance System calibration especially) place extra strain on their resources. This may explain why fewer than 6.5% of technicians were EV-qualified in 2022. However, we must highlight a growing band of independent specialists, many of whom are members of the Hybrid and Electric Vehicle Alliance: HEVRA: **https://hevra.org.uk/ev-garages-near-me/**, and so owning a BEV does not mean that you are alone, even if you do not wish to perform any DIY work.

The lack of high-voltage qualified repairers might explain why BEVs tend to be written off for relatively little damage by insurance companies. The irony is that many repair tasks do not even go near the high-voltage system. Even so, the requirements for garages to comply, especially with safety requirements, means that labour rates tend to be higher for those cars. Certain spares can also be more expensive, compared with their combustion-engined counterparts. While BEVs might not require as many consumables during servicing, repair costs can be as much as 50% higher. The issue is not helped by main dealers replacing large and expensive components, such as battery packs and inverters, rather than repairing them.

BEV SERVICING



BEVs still require routine maintenance. While they do not possess combustion engines, certain systems have become vital to the car's functioning, such as the air-conditioning system. On this Tesla, a technically-interested owner can check the status of various functions on the main touchscreen, as well as accessing and recording maintenance information.

▶ Some EVangelists assert that, because BEVs lack an engine, they do not require routine maintenance. Tesla could be accused of perpetuating the myth, because it has no set service schedule, despite possessing parts that require routine replacement.

While it is true that BEVs do not require fuel filters and as many lubrication flushes, compared with a combustion-powered car, they need periodic attention. Consult the service schedule (if available) because not all of them are the same. For instance, some BEVs use air-conditioning to cool the battery pack and so extra checks on the circuit may be necessary. Other BEVs, such as certain Tesla models, require transmission oil and filter changes, too.

Research any extra items that require attention, as the car ages, which experience has uncovered. An issue that is virtually universal among virtually all BEVs is binding brakes. As many drivers rely solely on the regenerative braking, the friction brakes are not used sufficiently. Therefore, they do not generate sufficient heat to evaporate moisture. The resultant corrosion prevents the brakes from releasing fully. Thankfully, the friction aspect of BEV brakes is largely conventional.

Surprisingly, BEVs possess a low-voltage battery to 'start' the car. Should it become discharged, the vehicle will not activate the high-voltage circuit, so the car cannot be driven. The battery also runs the conventional 12-volt electrics, which includes many of the accessories. The exception to this might be the heating, ventilation and air-conditioning (HVAC), which may utilise the high-voltage system. Most of these low-voltage batteries are conventional 12-volt lead-acid batteries, which require maintaining in the usual fashion. Do not forget that, unlike the high-voltage battery pack, lead-acid batteries last longest if kept at full charge. Certain post-2021 Tesla models are notable exceptions, because they are equipped with a 16V Lithium-ion battery. Follow the handbook's instructions for 'jump-starting', or recharging advice.

As with any car, each model will have certain weaknesses, be it electrical, or mechanical. *CM* intends to report on how to deal with these issues, as BEVs become more widespread.

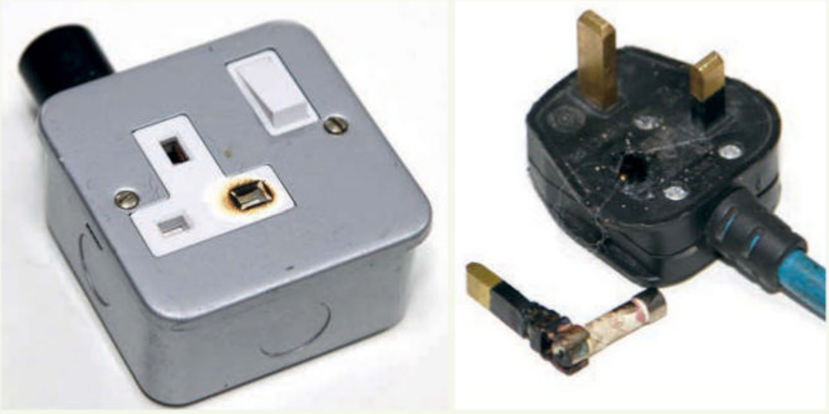
⇨

ROB'S TOP TIP

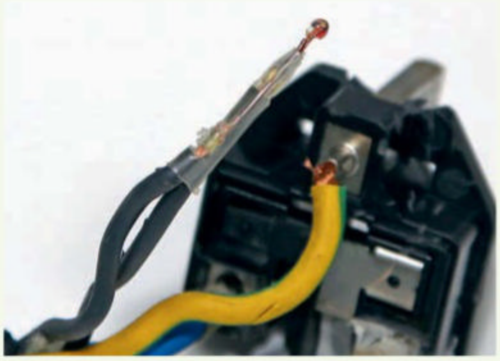
Obtain insurance quotes on your chosen EV, before purchase.

CHARGING CONSIDERATIONS

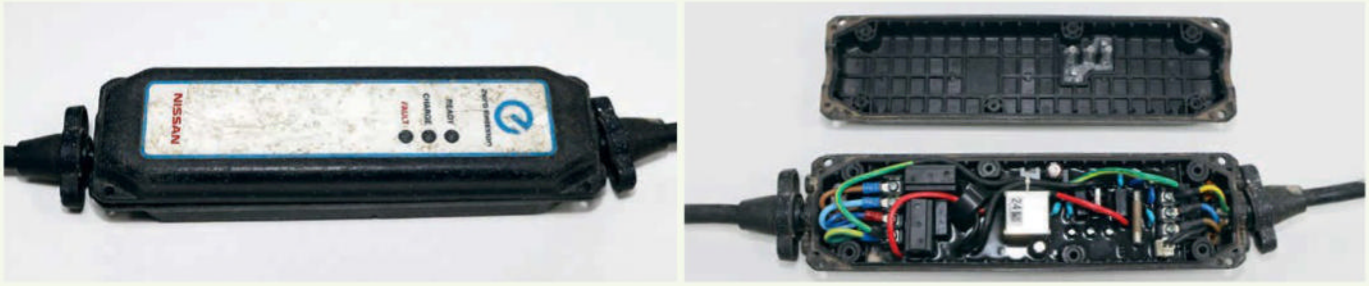
▶ While safety should be your priority, when working on BEVs, consider the hazards, when charging them:



While you can charge a BEV (slowly) from a conventional socket, consider that it is the duration of current draw that could cause a fire risk. While a vented tumble dryer may demand 2500 watts for 90 minutes, a BEV could demand similar levels of power for over ten hours. This can cause parts of the domestic circuit to overheat.



This genuine Nissan power lead shows the importance of not buying cheap knock-offs. Genuine parts include safeguards, such as the pictured thermistor. This reduces the risk of fire that could destroy not just your car but also the property – and poses a risk to life.



Should the car detect a problem with itself, it will disable the charging process. Yet, the vehicle cannot detect a fault between the power source and the vehicle's charging socket. High-quality leads possess fault-detecting circuitry, which inexpensive copies can lack.

BEV SAFETY

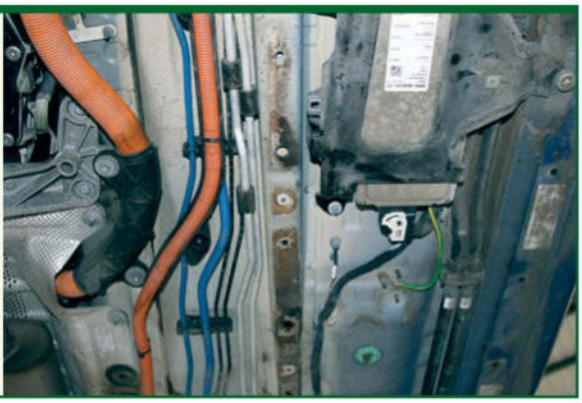
▶ While BEVs are extremely safe vehicles to run, consider the considerable risks that high-voltage systems pose to the enthusiastic DIY repairer. Typical high-voltage batteries operate between 400 and 800 volts and around 150 amps. Within the context that 0.05amps and 60 volts (approximately) tend to be all that is needed to breach human skin's electrical resistance and stop your heart, not taking the right precautions is extremely dangerous. This is why professional technicians undertake dedicated high-voltage training to keep them safe, before they work on BEVs.

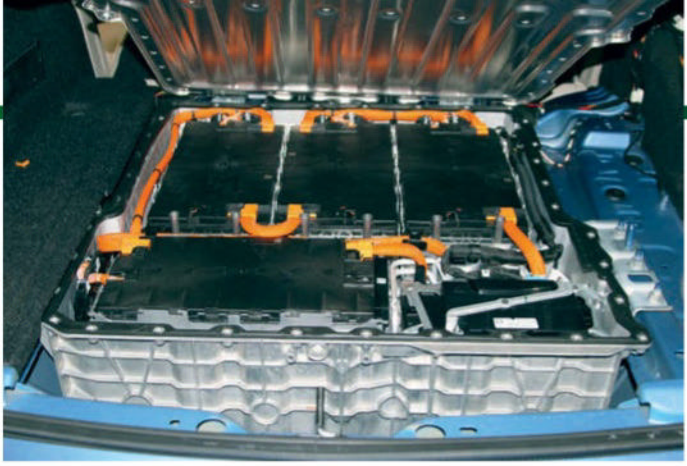
When looking at BEV repairs, consider whether you need to go near the high-voltage system at all. Many faults, involving the brakes, suspension and ancillary equipment, can be addressed conventionally, provided that you do not go near the battery pack, or any associated components, such as the inverter.

While this feature is not designed to replace professional training, we should emphasise that you will need extra safety equipment, should you venture near the high-voltage system. This includes dedicated, high-resistance, Class Zero gloves, which are IEC/EN60903 compliant. Note the expiry date and check that they have not been punctured in storage. Dielectric overboots should also be worn, meeting EN50321 Class 0/ASTM F1117. Conventional hand tools are also inadequate; procure insulated tools that protect you from high voltages. A multimeter is essential, not just for diagnosis but also for checking that the high-voltage system has been discharged. A conventional automotive item might be unsafe, unless it complies with IEC/EN60900 and is insulated to a minimum of Category (CAT) III/IV.

HYBRID COMPROMISES

▶ Consider that BEVs are relatively simple mechanically, compared with high-voltage hybrids. When bodyshells are used to accommodate a variety of drivetrains, engineers are restricted with the packaging. This can make layouts cluttered and expose some components at risk of damage. Pictured is the underside of a BMW 330e with its undertrays removed. Pictured left to right are the orange high-voltage traction motor cabling, the smaller inverter-to-charger unit cable, two blue fuel lines, black brake pipes, refrigerant battery cooling pipes, the inverter unit and two coolant pipes. The inverter's proximity to the jacking point makes it especially vulnerable to damage.





Hybrids that can be driven in electric-only mode are very likely to possess a high-voltage battery. Pictured is the high-voltage battery pack from a BMW 330e PHEV, containing eight modules, each of which is rated at 60 volts. The pack is pictured positioned within the spare wheel well, with its lid raised.

On some (but not all) BEVs, the air-conditioning system cools and warms the battery pack, for optimum efficiency.

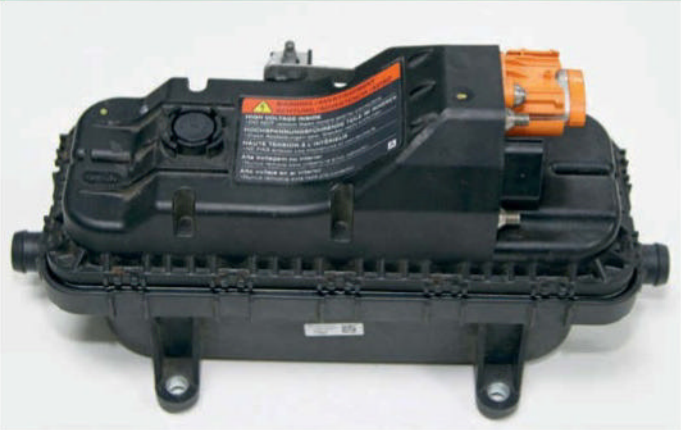
BEV differences

Understandably, most DIY-orientated owners are familiar with combustion engines but are BEVs really that different? Ultimately, BEVs are motorcars. In most cases, the suspension systems, bearings, friction brakes and even the networked 12-volt electrical system are conventional.

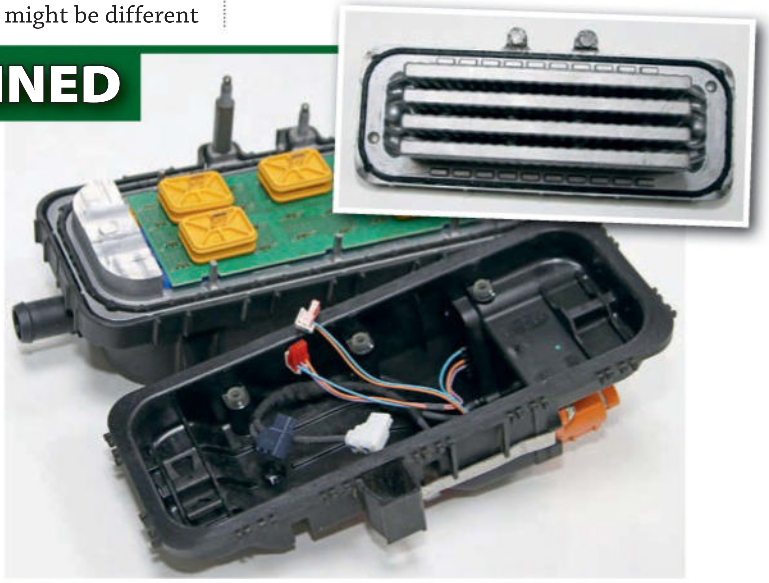
Generally, there are two types of BEV. Bespoke BEV-only models, such as Teslas, are designed specifically for an electric powertrain. Alternatively, some bodyshells have been adapted to accept an engine, or an electric motor, such as the Volkswagen e-up! Should you choose a model that is available with petrol and diesel power options, be aware that some parts might be different (and more expensive) on the electric version. For instance, Vauxhall's Corsa-e BEV possesses different suspension components, compared to its combustion engined sisters, to compensate for the additional battery weight.

The ensuing picture captions highlight some BEV-specific parts and an overview of what can go wrong:

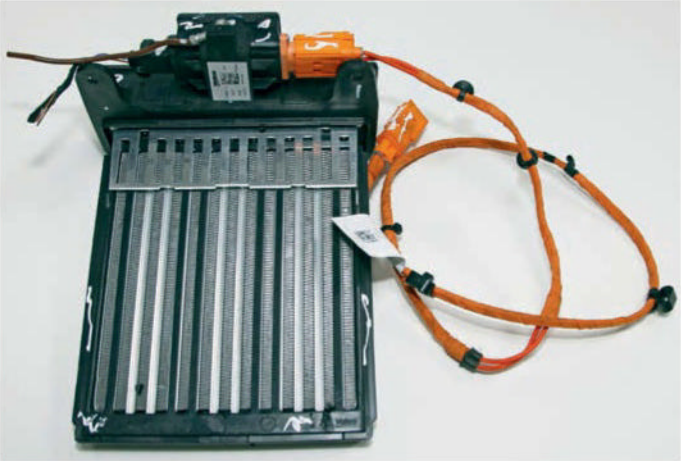
BEV COMPONENTS EXPLAINED



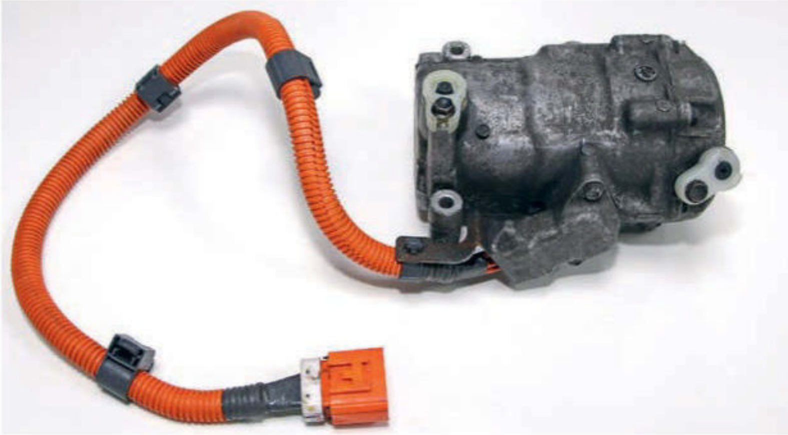
A1 **Like engines, BEVs require thermal management systems to maintain a temperature window for maximum efficiency. This water heat exchanger warms the coolant, using energy from the high-voltage system, evidenced by the orange connector.**



A2 **Typical issues with these exchangers include the water seal failing and the control electronics becoming wet. The inset picture shows the element, which fits inside the plastic housing.**



A3 **As BEVs lack a suitable hot water supply, the heater matrix contains a high-voltage heating element. Some diesel cars possess PTC heaters, which supplement the heater matrix, although these models lack a high-voltage system and so rely on the less effective 12-volt circuit.**



A4 **As they lack a mechanical drive pulley, air-conditioning compressors are powered by the high-voltage system. The refrigerant circuit is used, on some models, as part of the thermal management system to regulate the running gear's temperature. They tend to require a non-conductive POE oil, instead of the more common PAG lubricant.**

⇨

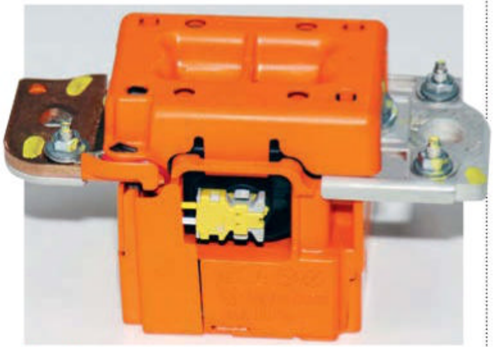
ROB'S TOP TIP
High-voltage systems are identified by orange cables.

BEV COMPONENTS EXPLAINED CONTINUED

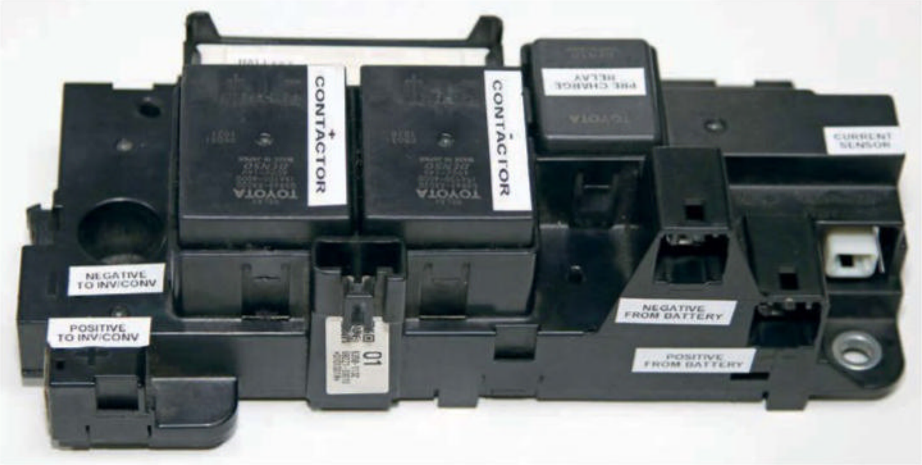
RENAULT NISSAN

A5 ◄ Many BEVs possess conventional lead-acid batteries to activate 'Ready' mode and to power the accessories. Should it be disconnected for a long time, the high voltage system may introduce voltages higher than 14.4 volts, just like a smart alternator on a newer combustion vehicle. Some BEVs will recharge the low-voltage battery, even when out of 'Ready' mode and the vehicle locked.

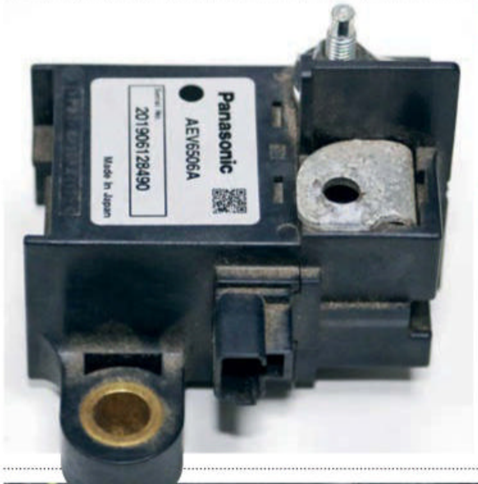
A6 ► The exceptions are more recent Teslas, which possess a 16-volt battery, with integral management software. Take extra care not to damage this battery, especially if performing a 'jump-start' operation. According to Delphi, prices for replacements are reasonable and so do not panic if you need a new one.



A7 Contrary to some reports, BEVs are very safe to use and drive. Pictured is a Tesla high-voltage battery 'Pyro Fuse'. This overcurrent device is connected to the high-voltage system and prevents any high voltages from passing through, should the car detect a fault serious enough to present a safety risk.

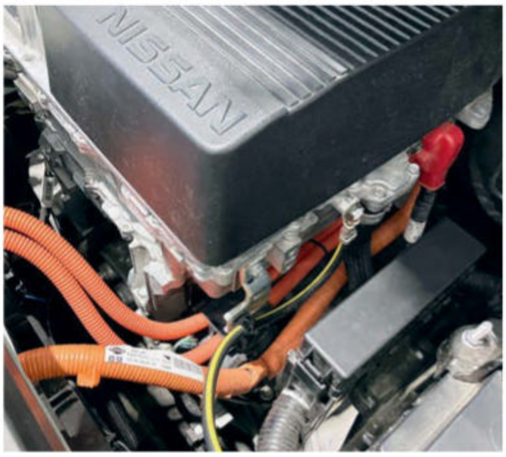


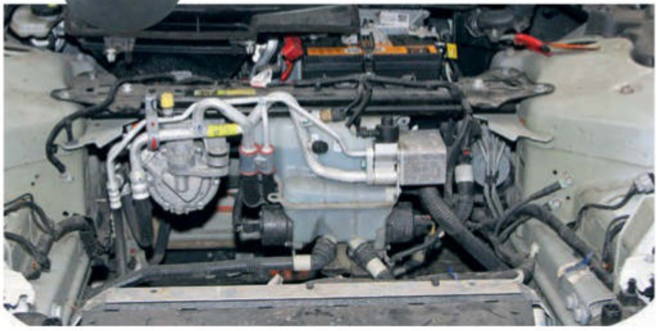
A8 The contractor plate/relay pack acts as an on-off switch for the high-voltage battery, through which all power flows. This example is taken from an older Toyota hybrid.



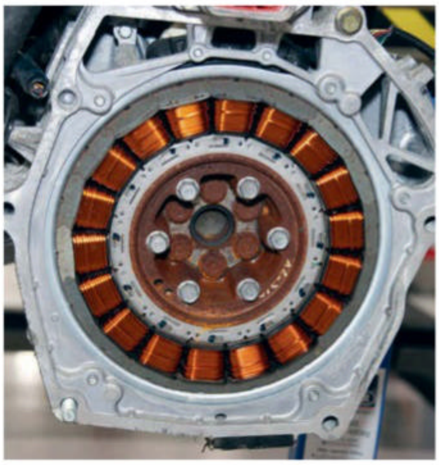
A9 ◄ A variety of relays are fitted within the battery pack. Pictured is one that has been extracted from a 40kWh Nissan LEAF's battery pack. This heavy-duty relay can be bench-tested, as explained in Steps D1-D4.

A10 ► The Nissan LEAF possesses an onboard charger, which converts mains AC to DC. It has another AC-DC converter for incoming current from the motor to the high-voltage battery, which provides the regenerative braking function. It also possesses a DC-DC converter, which reduces the voltage to a safe level, needed by the 12V battery and ancillaries. All three of these units are contained within the power electronics unit.





A11 BEVs are not 100% efficient and shed waste energy as heat. This is why cooling systems are required. Some cars rely on air; others employ liquid. Like conventional cooling systems, the coolant must protect against corrosion and will possess periodic drain intervals. Selecting the correct chemical composition is vital.



A12 ◄ Space prevents us from considering the electric motor in this issue. Aside from occasional bearing failure, they appear to be reliable. The safety software will detect any short circuits within the motor windings and will shut down the high-voltage system. Pictured are the high-voltage stator windings not from a BEV but the first-generation Honda Insight Hybrid.

Continued on page 12

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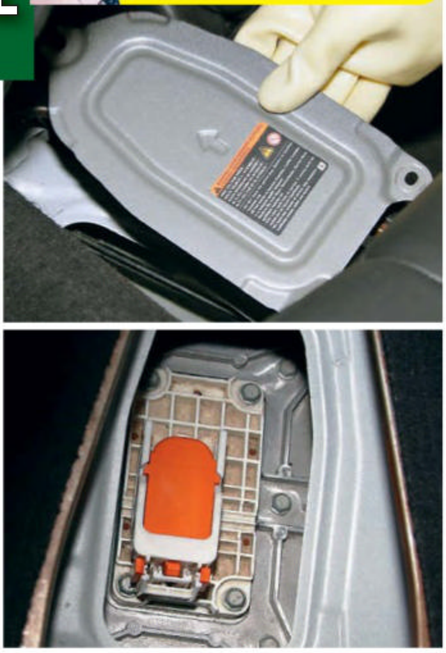
ROB'S TOP TIP

DIYers possessing Pacemakers should check if it is safe to work on high-voltage vehicles.

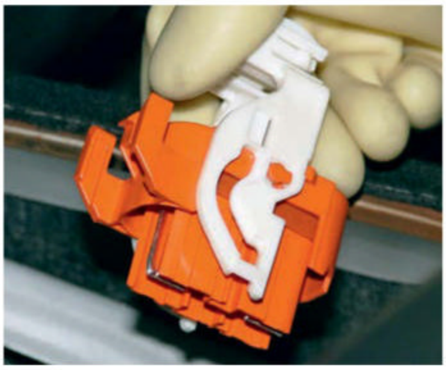
HIGH-VOLTAGE BATTERY REMOVAL
2020 NISSAN LEAF

B1 Should you be looking to diagnose, or replace, individual components, ensure that the low-voltage battery is charged fully and follow any instructions regarding the high-voltage battery's State of Charge – Nissan recommends between 50 and 80% but other manufacturer specifications may vary. Read and note any fault codes. Switch off the ignition, by ensuring that the car is out of Ready mode and keep the driver's window lowered. Place the keyless fob out of communication distance, thus ensuring that the system does not re-energise. Disconnect the 12-volt battery's earth cable.

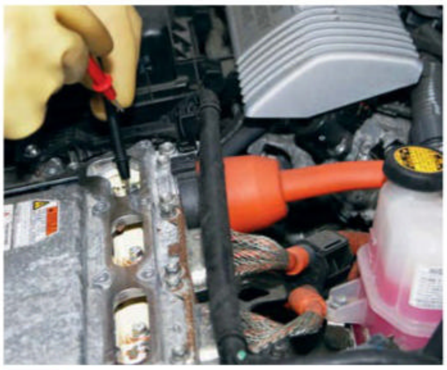
B2 Observe the high-voltage safety protocols. Check that your insulated gloves are in date and not punctured. A useful way of doing this is to inflate each glove and verify that air does not leak out. Specific health and safety information is described elsewhere in this article but more general advice about working safety can be found in last month's magazine.



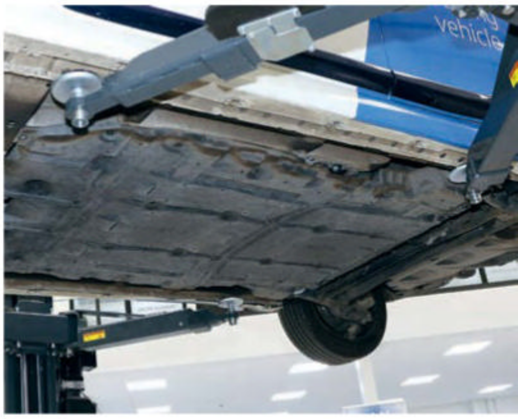
B3 Remove the high-voltage service plug. While it isolates the battery pack from the electrical system, it does not mean that high voltages are still present outside the battery. On this car, it is accessed in the centre of the rear floorpan, beneath the carpet. Remove the metal cover, taking care not to puncture your insulated gloves.



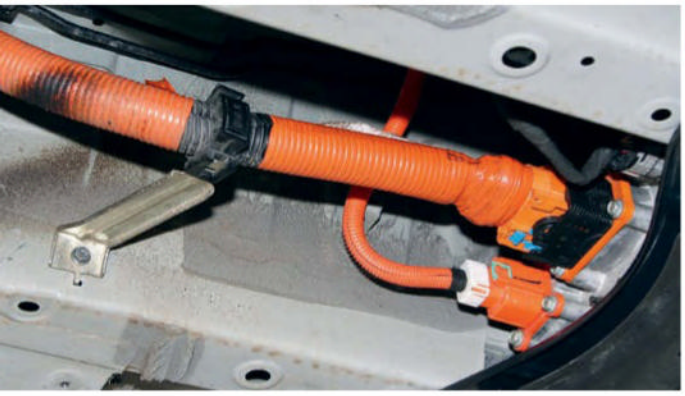
B4 The self-locking service plug can be manipulated from the battery, taking care not to break off any locking plastic tabs, and stored safely away from the car, where it cannot be lost. Wait ten minutes, to give the electrical system time to discharge. It is wise to insulate the exposed live terminal with a 1000-volt insulating mat to prevent debris from entering the service plug. Alternatively, use Nissan's dedicated locking tool – part number NI-4031.



B5 Should you intend to work on a high-voltage component, you must check that the system has discharged. Typically, this involves measuring voltages at the inverter, with a suitably-insulated multimeter. Pictured is the measurement taken from a Toyota Prius, which might be a hybrid, but it still possesses a potentially lethal high-voltage system. As this battery is to be removed, the test is performed on the high-voltage harness connector – see step B15.



B6 The car will need raising to allow access. Lifting arm positions are essential on BEVs. The battery pack behind the plastic covers is not designed to support the car's weight. Should the pressed steel casing become crushed, it is likely that the battery modules/cells will be damaged. This could increase the risk of thermal runaway and a vehicle fire.



B7 ◀ On this LEAF, the plastic undertray is in several sections. Unbolt and remove the front section that provides access to the high-voltage cabling.

B8 ▶ As with the front section, unscrew the retaining bolts and remove the centre section...

BATTERY HEALTH

▶ As the high-voltage battery represents at least half of a vehicle's value, its condition on a used car should be your main concern. A battery's charge level is different from its health. Battery charge can be increased by recharging. Health (or 'capacity') relates to how much energy the battery can store. Capacity will reduce over time, meaning that the miles ('range') that you can cover between full charges will reduce.

Yet, like a combustion engine, useful remaining battery life depends on its usage history. Fast-charging, or being kept fully-charged, while the car is stored, are typical situations that hasten battery degradation. Therefore, apart from the car's age and mileage, it is useful to have details about the battery's past charging history.

Should you buy a used BEV from a trader, ask for any battery condition reports. The problem is that there is no single standardised battery health measurement, an issue that is seen as so important politically that the Labour government's manifesto committed to implement a test with state-approved methodology.

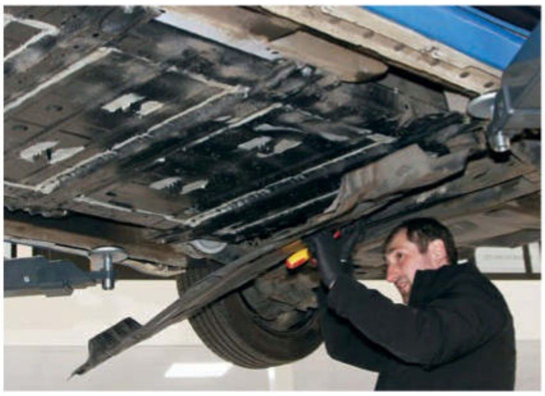
Expect the battery to lose around 1% of its capacity per year. Additionally, check for any remaining warranty on the battery pack from the manufacturer, in addition to extra aftermarket guarantees that are offered by the vendor.

Despite the lack of standardised battery testing, you do not have to rely on Lady Luck, especially if you are taking a chance and buying at auction. Some brands have dedicated apps, which utilise an OBD dongle but research what is available for specific make and models. Perhaps the best-known example of this is Leafspy for the Nissan LEAF. However, when comparing the proprietary software with its professional-grade DS diagnostic software that reads data directly from the Battery Management System (BMS), Delphi reports that Leafspy tends to give lower readings. For clarity, Delphi confirms that its DS equipment produces results that are consistent with other professional-grade diagnostic equipment.

Even so, there are products available to the DIYer. Austrian battery diagnostic company, Aviloo, has designed and developed a mobile-phone-based app. It relies also on a dongle, plugged into the OBD socket, to extract the information. Should you be looking to buy a car, you can perform a Flash Test to calculate the battery's State of Health, which takes around five minutes. This assesses information, taken from the car, and compares it with a huge data set, based on similar running models predominately in Europe. The resultant score will provide a reasonably accurate result. While intended more for the motor trade, this assessment costs £49 per test.

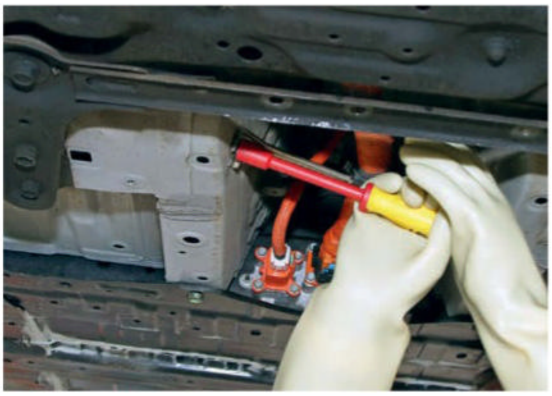
Instead of calculating battery capacity, 'Aviloo Premium' (RRP £99.99) is designed more for private car owners and performs measurements, not calculations. The testing process takes longer and involves charging the battery fully and then discharging it by 90%. As the car is driven, the test assesses not just the cells' condition but it can also deduce battery history, communication system effectiveness and even the 12-volt circuit's integrity.

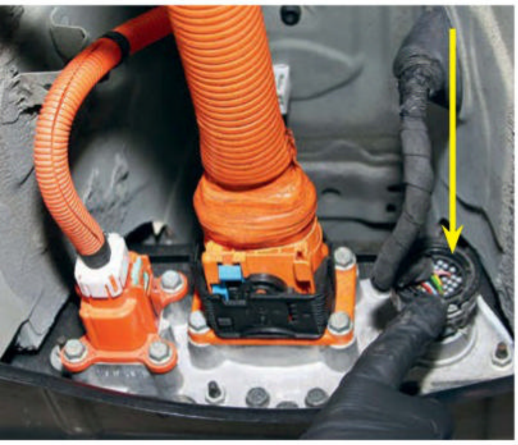
The Aviloo dongle is available from Wrexham-based Maverick Diagnostics (www.batterydiagnostics.co.uk). For more details, e-mail evbatterydiagnostics@maverickdiagnostics.com, or call 01978 594 013.



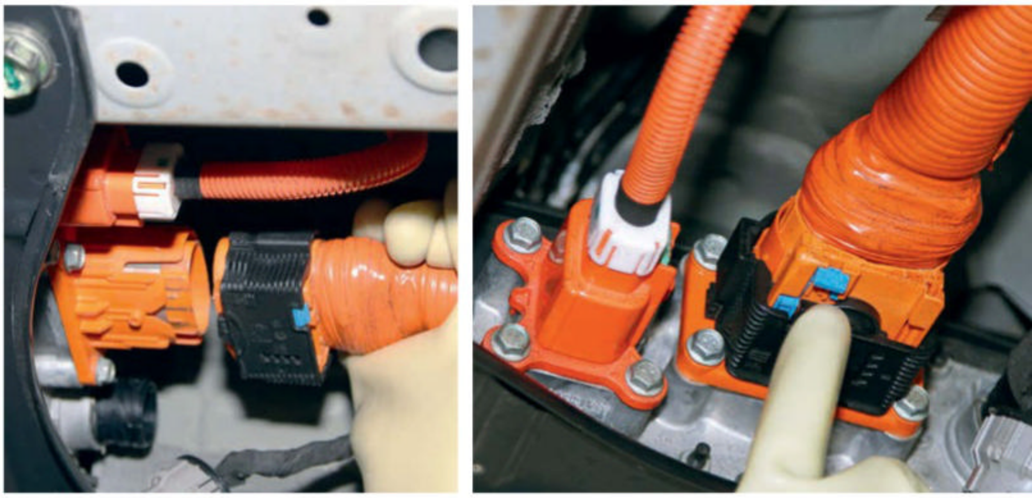
B9 ◀ ...followed by the rear undertray. Look over the battery's outer casing carefully for damage.

B10 ▶ Remove the cable support, by unscrewing the 10mm bolt that secures it to the floorpan. Note the use of protective gloves and insulated tools. These are necessary, because you cannot be certain if lethal voltages remain within the cabling.





B11 Disconnect the low-voltage battery management system's communication connector from the battery pack (arrowed). This moulding is unlocked, by being twisted anti-clockwise, prior to being withdrawn.

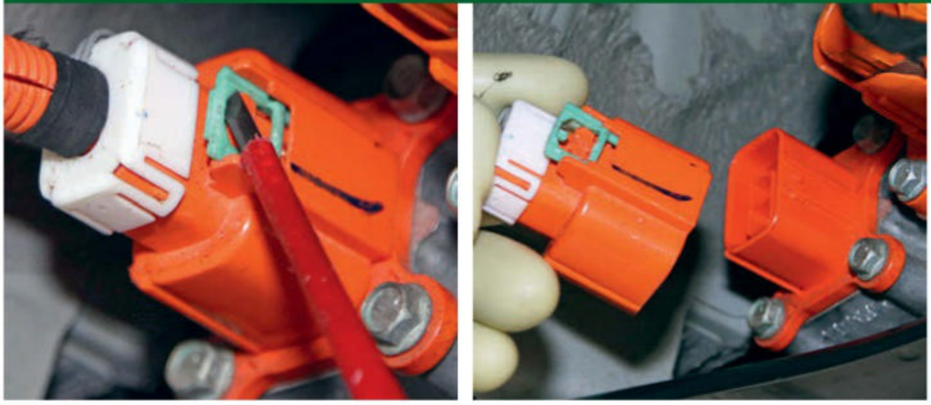


B12 This Nissan high-voltage connector possesses a blue locking tab (pictured) and two locking buttons on the side and top. Excessive force must not be applied. Once unlocked, the connector can be pulled free. Again, note the necessary high-voltage PPE.

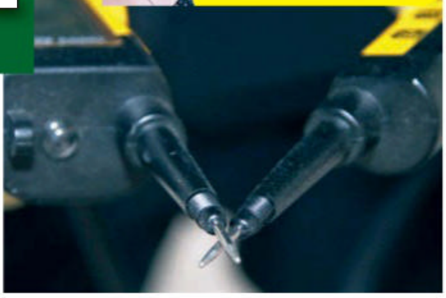
ROB'S TOP TIP

Remove all metal objects from your body, including rings.

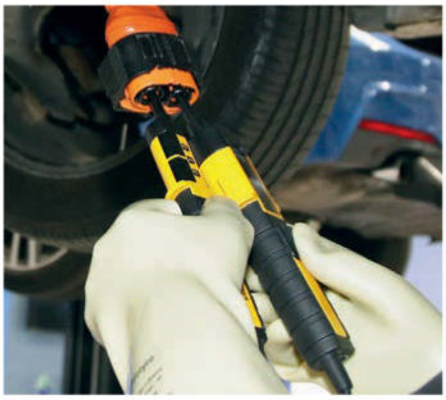
HIGH-VOLTAGE BATTERY REMOVAL 2020 NISSAN LEAF CONTINUED



B13 Finally, disconnect the PTC heater power feed, by manipulating the green plastic clip and depressing the orange button and pulling it free.

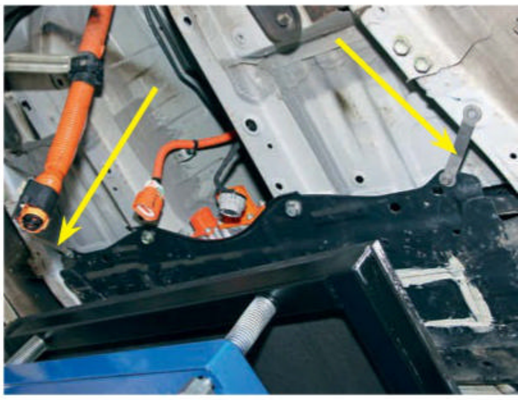


B14 You must check for the presence of high-voltage within the vehicle's electrical system, so you can be sure that the hazard is not present. You will need at least a Category III multimeter, rated at 1000 volts. This one is a Category IV. These assess not just voltage but also circuit continuity. Test that the machine works, before using it, even if it has a self-diagnosing function.



B15 Measure the voltage, by inserting the probes into the high-voltage wiring harness (pictured in Step B12). Should the reading be zero, or very near, the high-voltage capacitors within the inverter have discharged.

B16 As BEV batteries are heavy, dedicated hydraulic lifting tables not only can bear the weight but also spread the load. It would be extremely dangerous to allow the battery to either drop onto axle stands, or fall to the floor, unsupported. Treat the battery as a delicate component.



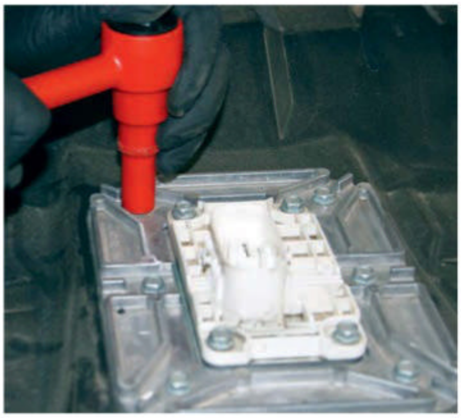
B17 The fixings that hold this LEAF's battery pack to the floorpan comprise two 18mm bolts at the front. Note the earth straps on either side (arrowed), each of which requires a pair of 10mm bolts to be removed.

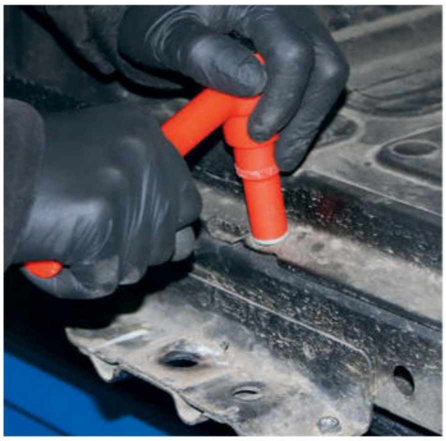
B18 ◀ An additional trio of 18mm bolts hold the battery case to the floor on each side. The rear end possesses a pair of brackets that connect the battery to the boot floor. The battery can be separated from the brackets by removing four 16mm bolts.

B19 ▶ The battery is supported, as the bolts are unscrewed. Once all of them are removed, the battery is lowered slowly and gently.

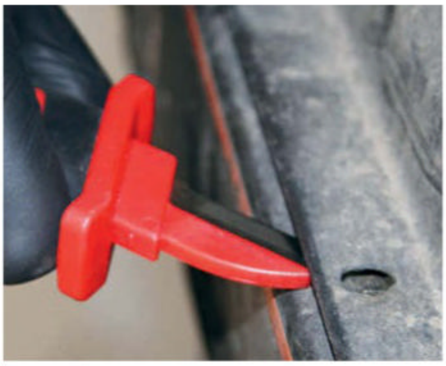
B20 ◀ Some battery packs can be opened up to test, remove and replace internal components, from battery cells to relays and temperature sensors. The experienced specialist can remove modules, install second-hand ones, and balance the battery. Should you open the battery up, do not forget that lethal voltages are present that cannot be isolated.

B21 ▶ The isolator port is secured to the battery pack's outer casing on this LEAF battery by six 10mm bolts, which are removed, first. These fixings ensure a tight fit between the port's airtight seal and the outer casing.

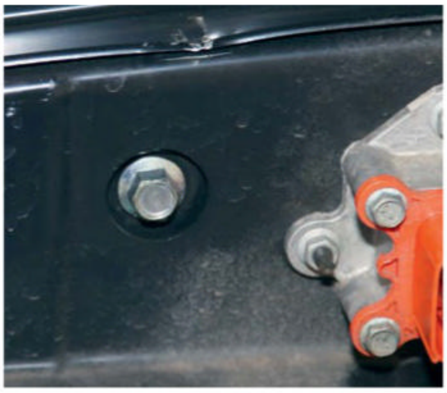




B22 The two battery halves are held together by bolts surrounding the 10mm parameter of the pressing.

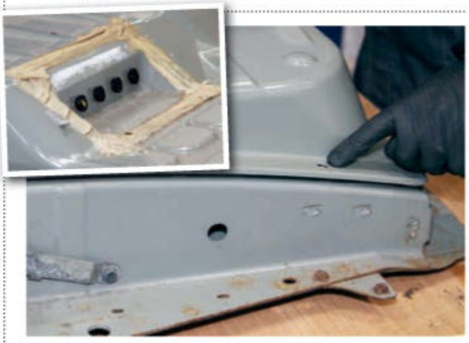


B23 As the battery pack is sealed, you need to remove the sealing. Later LEAFs, such as this one, possess a mastic seal, which must be breached with a sharp knife. Earlier examples of the Nissan BEV have a rubber seal – see step B27.



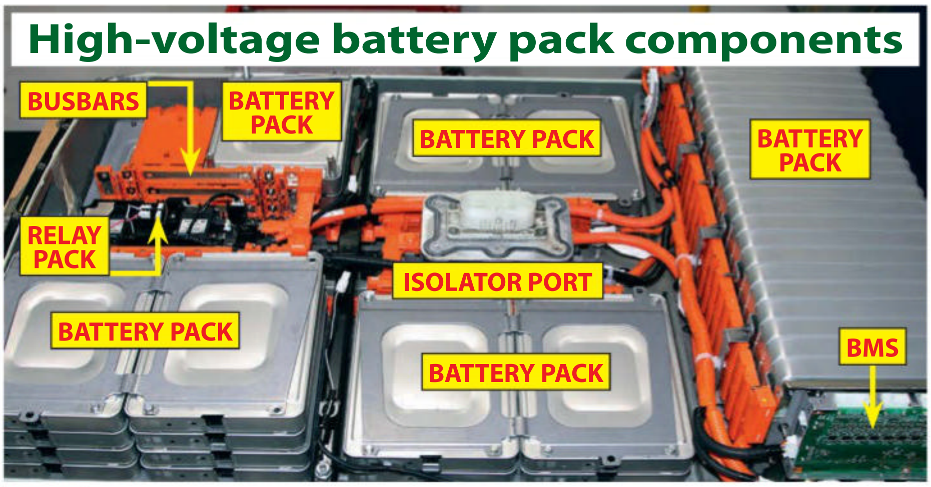
B24 After reassembling the battery pack, removing this bolt facilitates the fitting of an adapter valve, so an air pressure test can be performed, to verify that the battery pack is airtight.

B25 Another one of Delphi's training BEV batteries shall be used to detail what is inside. This unit is from an older LEAF. The main difference is that these earlier packs employ more bolts that hold the two halves together.

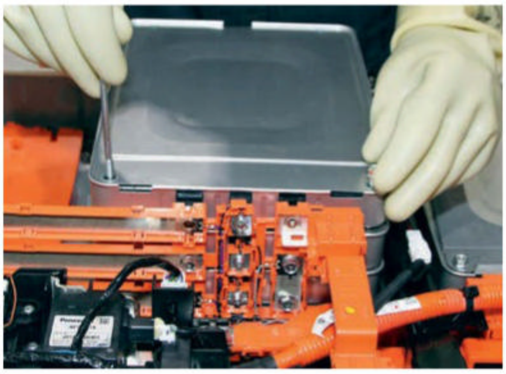


B26 This older battery pack also possesses vents, to relieve pressure build. It also lacks the high-voltage cable for the cabin heater. Therefore, it possesses only two main electrical sockets – one high voltage and one low voltage. A pressure test blanking bolt remains.

B27 It is easy to forget that lethal voltages lurk inside that cannot be deactivated. High-voltage PPE is still required, when removing the battery pack lid. The rubber gasket, used to seal the bottom and top covers together, should be replaced, regardless of condition.

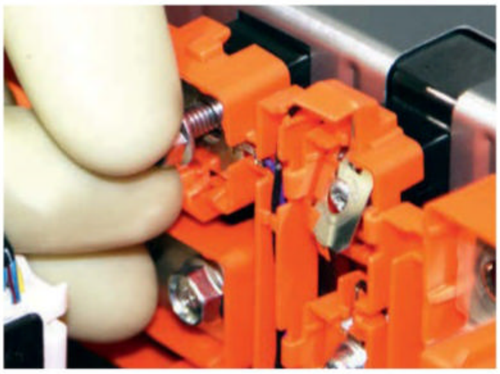


B28 This 400-volt battery possesses both horizontal and longitudinal battery modules. Note that the battery modules on the top left have been removed.



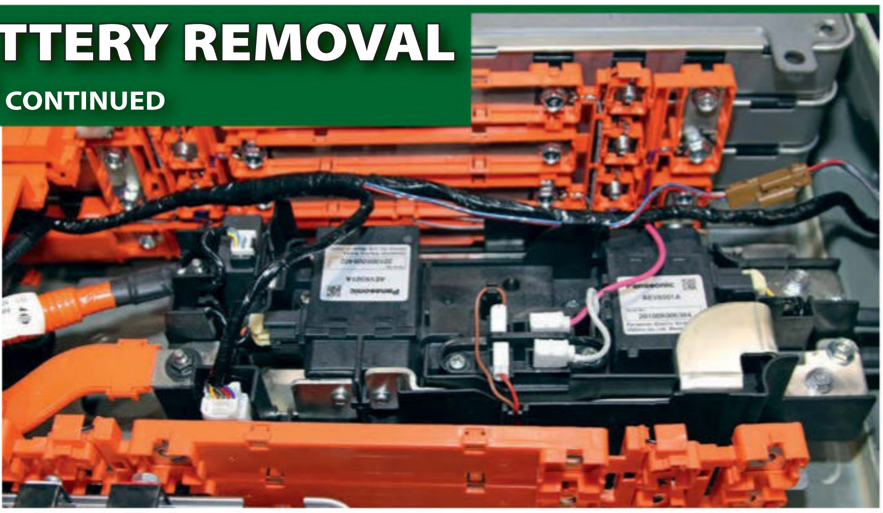
B29 ◀ Each battery pack comprises modules stacked together; one of which is pictured. These are bolted securely into the casing. This battery possesses 48 modules but 96 values are displayed on the live diagnostics. This is because the vehicle measures the voltages from two pairs of parallel cells within each module.

B30 ▶ All modules are connected in series by busbars, to achieve the necessary high voltages. Essentially, these are metal conductive strips that fit inside the insulated plastic mouldings.

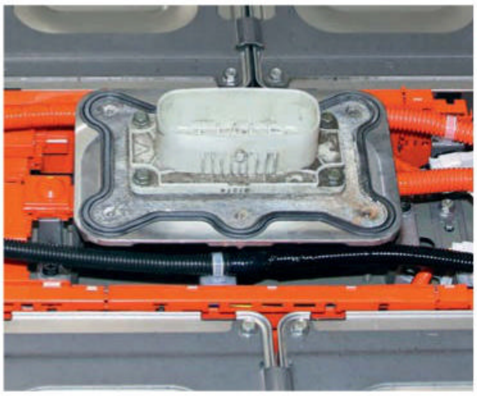


HIGH-VOLTAGE BATTERY REMOVAL
2020 NISSAN LEAF CONTINUED

B31 Each module contains four cell pouches. Two of them are connected in series; two in parallel. You should not try to open up the modules, because there is a very real risk of thermal runaway, or an explosion. The pictured cutaway that Delphi uses for training was created by a trained professional, using special equipment.

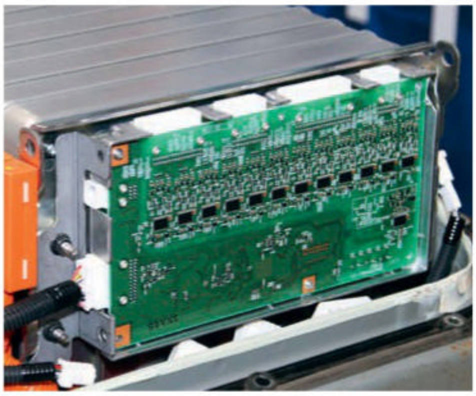


B32 As its name describes, the relay pack/contactor plate contains not just a relay but also a ballast resistor, which prevents the relay contacts from arching and burning out. Another relay is incorporated for the pre-charge function.



B33 ◀ The isolator port (pictured in Step B3) also splits the battery pack in two, by isolating the output voltage, when required. Note the rubber weather seal, mentioned also in Step B21.

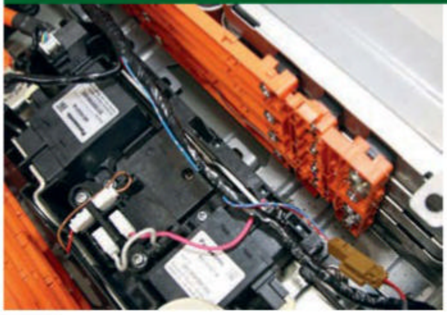
B34 ▶ The information within the Battery Management System (BMS) circuitry is accessed via the OBD diagnostic port in the car. This provides not just fault codes but also live data. You can, therefore, have a good idea about the condition of the various components, including individual modules, using information that is processed by the BMS. This BMS is pictured with its circuitry exposed, for Delphi's training needs.



B35 ◀ One of the most important parameters is battery temperature. This explains why temperature probes are mounted on each battery pack, which feed information continuously to the BMS. This pack possesses four temperature sensors.

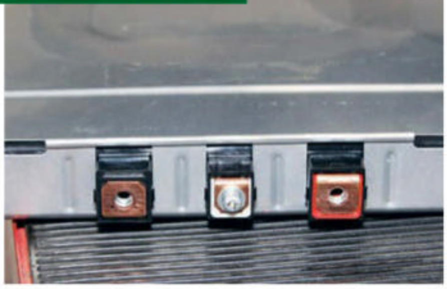
B36 ▶ Here is another temperature sensor. This one, when fitted, is positioned in the middle of a central battery pack. The battery pack also possesses a substantial wiring loom, not just to carry current but also to feed back the state of each cell back to the BMS.

MANUAL BATTERY MODULE & CELL TESTING

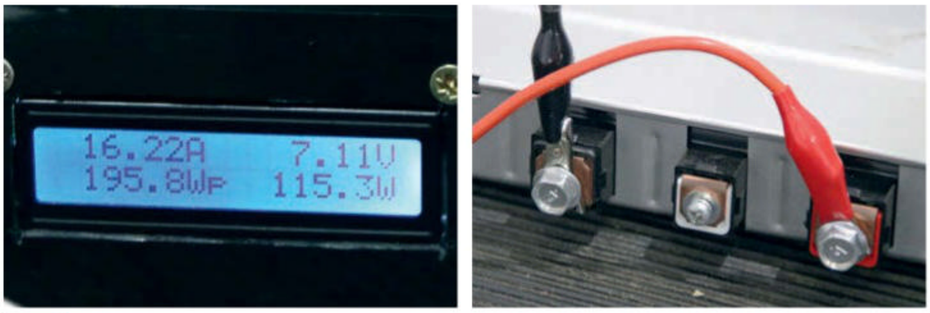


C1 The individual battery module bodies can be unbolted and removed from the battery casing. The connections to the busbars are held in place by screws but getting to them is not always easy. To access the busbars on this unit, the relay assembly would need to be removed. Once dismounted, check the module body carefully for swelling.

C2 You can measure the voltages within each module. On these LEAF modules, do not forget that two cells are connected in series and two in parallel. Therefore, you cannot assess each cell, only a pair. As each module possesses a relatively low voltage, you do not need high-voltage protection when working on them individually.



C3 The red connector serves as the positive for the two cells, connected in series. The pair of connected parallel cells utilise the centre connector. As you cannot assess each cell, a voltmeter will record only the cell with the highest voltage. It is possible to tell only which pair is defective. To do this, a ballast test puts the cells under load. A faulty pair of cells will see a significant voltage drop.


16.22A 7.11V
195.8Wh 115.3W

C4 The pair of cells that are connected in series measured 7.8 volts. With a 16-amp current draw, the voltage fell to 7.1 volts. The meaning and interpretation of this result are provided in the manufacturer's technical data, which is inaccessible to not just DIYers but also much of the motor trade. Where a car is very popular, such as Nissan LEAFs, Renault Zoës, *et al*, you are more likely to get informed views about your measured voltages from garages and enthusiasts. Delphi informs us that the voltage drop on these cells is acceptable but not perfect: they are worn.

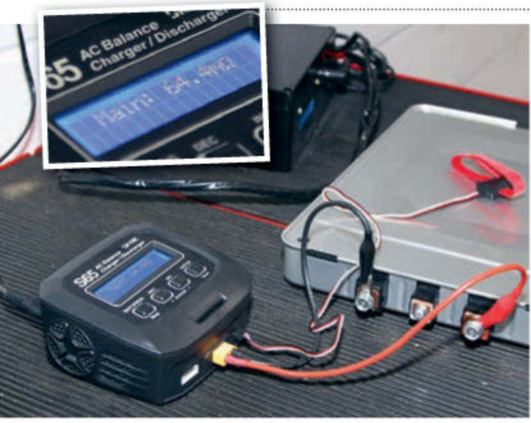
THANKS TO

Delphi

We are grateful for the advice from the team behind Delphi's new Academy, which is hosting a variety of courses that are aimed mainly at professional technicians.

For more information on Delphi's Academy, see: **https://www.delphiautoparts.com/en-gb/workshop-solutions/delphi-academy**

Courses can be booked online, via: **booking.delphiautoparts.com**

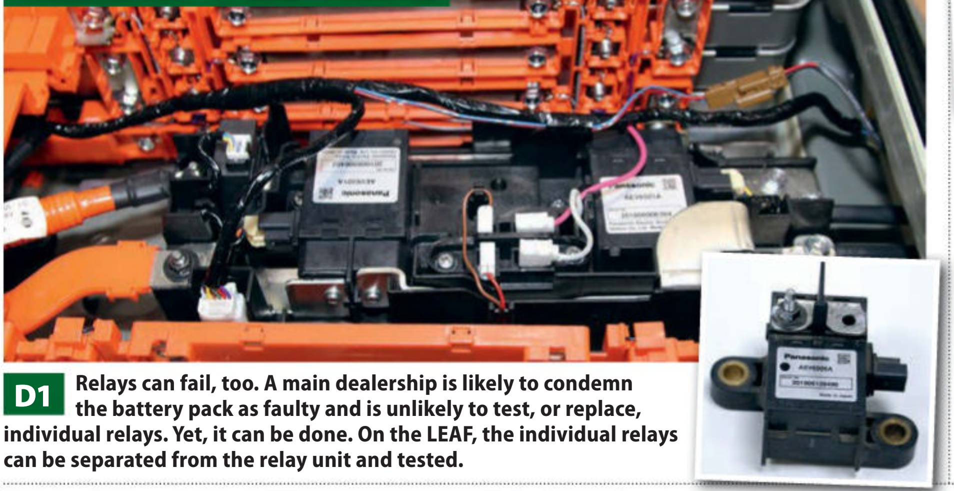

S65 AC Balance Charger / Discharger
Maint 64.4mΩ

C5 ◀ Module condition can also be assessed by recharging each pair of cells with a dedicated charger and measuring the resistance. A defective cell pairing will record either a high, or low, value. Again, with no data available for comparison, it is very hard to interpret the results but you can take advice from knowledgeable specialists/garages/owners.

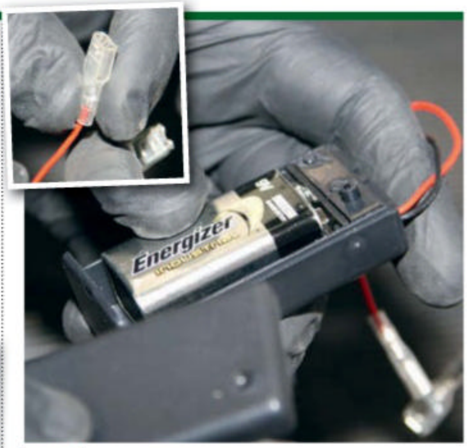
C6 ▶ While you cannot renew defective cells, you can exchange complete modules within a battery pack. Certain specialists are stocking healthy used modules from salvage cars. However, before being installed, a replacement module must be balanced, to ensure that all cell voltages are the same.

SKYRC
S65 AC Balance Charger / Discharger
LiIo BALANCE 7.21V(2S)
6.0A
ENTER
INC
DEC
BATT/PROG
STATUS

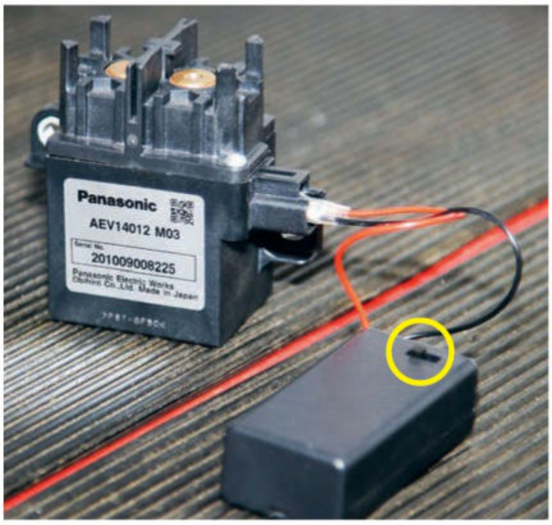
RELAY TESTING



D1 Relays can fail, too. A main dealership is likely to condemn the battery pack as faulty and is unlikely to test, or replace, individual relays. Yet, it can be done. On the LEAF, the individual relays can be separated from the relay unit and tested.



D2 These relays can be tested with a straightforward 9-volt battery. You can build a battery box, wires and connectors very inexpensively.


Panasonic
AEV14012 M03
Serial No.
201009008225
Panasonic Electric Works Co., Ltd. Made in Japan

D3 ◀ You can connect the relay as pictured. Note the switch on the battery pack (circled) that makes the test easier.

D4 ▶ When current flows from the battery, you should hear a series of 'clicks' from the relay that indicate that the contacts are working correctly. Typically, these comprise, the pre-charge function engaging, pre-charge disengaging, negative engaging, pre-charge engaging, positive engaging and pre-charge disengaging. To be sure, use a multimeter to confirm continuity.

>1000
Megger MIT400/2

CM Insider

Martyn Knowles brings you news and product reviews from the automotive industry

Lubricants under pressure from shorter journeys, warns VLS

▶ The latest data from the Department for Transport shows that people are making fewer trips and travelling fewer miles. Since 2002, average vehicle mileage has fallen from 9000 miles a year to 7000 miles in 2023.

Several factors are driving the changes, including the rise in people working from home, as well as the cost of vehicle insurance, servicing and fuel.

These changes in driver patterns have detrimental consequences for a range of engine components, including lubricants.

"Lubricants need to flow efficiently in order to protect the vehicle", says Alan Outhwaite, Chair of the Technical Review Panel at industry body VLS, the Verification of Lubricant Specifications. "A lot of wear can take place in the first ten minutes of start-up when the engine is cold. During shorter journeys, the oil does not get up to temperature. This means it doesn't flow as well and doesn't function as it should to lubricate and protect the engine.

Water is a by-product of combustion, so if you're not getting the oil up to temperature, small amounts of water can build up in the oil. This dilutes the oil, meaning that it will not function as designed. Water can also remain in the crankcase, which could lead to emulsification and corrosion, increasing wear in the engine.

Hybrid vehicles are even more complex and potentially more adversely affected by these changes in driver behaviour.

In a hybrid vehicle, you could be using the battery for part of the journey, so it can take up to 25 minutes for the oil to get up to temperature. This is significantly longer than the 8-10 minutes usually required in a conventional combustion engine. Hybrid vehicles then have the complication of a high-powered start-up, with the car management system using the battery for the first ten miles and then requiring the engine to start as the vehicle joins the dual carriageway at high speed and high revs, creating a shock to the engine componentry and putting the lubricant under increased stress.

Lubricants aren't the only component compromised by shorter journeys. Shorter journeys don't give batteries time to charge fully and recover from the significant amount of power required to start the engine. Diesel Particulate Filters also don't get time to regenerate, which increases the likelihood of blockages and costly DPF replacements.

Oils are getting thinner in viscosity, and advanced additive technology is being used to protect engines during start-up and deliver fuel economy benefits. An increased build-up of water and other deposits due to shorter journeys can affect the performance of the additives in the oil, such as the anti-wear, anti-corrosion and dispersant additives. This can lead to a build-up of deposits in the engine and corrosion to engineered surfaces and components.

These changes in driver behaviour make oil changes more important than ever. It might be tempting for drivers to think that because they are doing fewer miles, they can save on servicing. Most cars recommend servicing at either a specific number of miles or a number of months, whichever comes first. With motorists driving fewer miles, the annual reminder will likely come first and should be adhered to.

Drivers with older vehicles need to know the recommended service and oil drain intervals and stick to them. Putting it off might seem like a short-term saving, but it could result in engine damage and costs that could have been avoided. Using the right oil is just as important for a 20-year-old car as it is for a two-year-old one.

To find out more about VLS's work to uphold standards in the lubricant industry and protect end users, visit **https://ukla-vls.org.uk/**

Schaeffler recommends INA OAP as solution for BMW engine vibration issue

SCHAEFFLER
INA
OAP

▶ Engine noise and vibration problems on BMW diesel engines can be down to the solid pulley on the front end auxiliary drive (FEAD) system, according to Schaeffler's REPXPERTs. They suggest to replace it with an INA Overrunning Alternator Pulley (OAP) where possible. The FEAD system provides power to an increasing number of engine functions, with each driven function adding extra strain on the belt system.

"Engine designers are relying on increasingly complex auxiliary belt systems to provide power to critical components," said Alistair Mason, Technical Services Manager at Schaeffler REPXPERT.

"Unfortunately, a solid alternator pulley will not absorb the constant rotational irregularities coming from the engine, or sufficiently prevent them either. This is especially true in diesel engines. Ultimately these vibrations can damage the entire drive system, creating noise and vibrations that can be heard and felt by the driver."

The problem can be fixed by upgrading the FEAD system to include an INA OAP. This is a particularly suitable option for BMW diesel engine cars manufactured between 2004 and 2011.

Just three INA OAP references cover BMW's 1-, 3-, 5-, 6- and 7-Series passenger cars, as well as the X1, X3 and X5 equipped with the 1.6 and 2.0 M47 and N47 diesel engines, and the six-cylinder 2.5 and 3.0 M57 and N57 diesel engines.

Schaeffler encourages us to stay updated with its latest news by regularly checking the REPXPERT app, or by visiting the website at: **www.repxpert.co.uk**.

News in Brief

UK Drivers demand 'Right to Repair' choice amid concerns over maintenance costs, survey reveals

▶ A survey has revealed a strong consensus among UK drivers: they want the freedom to choose where their vehicles are serviced and repaired. The survey, conducted by the Independent Automotive Aftermarket Federation (**IAAF**), which gathered responses from 1042 representative British drivers, highlights just how critical this right is in an environment where vehicle maintenance costs continue to rise. 92% of drivers agreed that they should have the option to choose which workshop services and maintains their vehicle. For many, the ability to choose their preferred repairer is seen as an essential way to keep maintenance costs manageable, while also ensuring that service quality remains high. The survey also found that 82% of participants support the idea of the UK Government updating legislation to safeguard consumer choice when it comes to vehicle repairs. Mark Field, Chief Executive of the IAAF, emphasised the importance of these findings: "The message from drivers is clear: they want to be able to choose where they have their vehicles repaired, and they need government action to ensure their right to do so. Without this, costs will continue to rise, putting additional strain on hard-pressed motorists." The IAAF continues to campaign for sector-specific legislation through its Right to Repair Campaign, advocating for changes that will keep the independent aftermarket competitive and accessible to all UK drivers. For more information on the IAAF's Right to Repair Campaign, visit the Federation's website https://iaaf.co.uk/

NEW FROM THE TOOL CONNECTION

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Sockets are manufactured from durable chrome-molybdenum steel, ensuring they withstand high-impact use.

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▶ From NightSearcher are these KangaStar Work Lights, which are compatible with 18V batteries from 13 leading power tool brands. Available in two models, they deliver powerful illumination of up to 4500 or 6500 lumens, with a beam range of up to 60 meters. Ideal for construction sites, workshops and outdoor environments, these lights offer four adjustable brightness modes (25%-100%) and up to 12 hours of runtime. Built with durable aluminium construction, IP65 waterproofing, a USB charging port, and tripod compatibility. The KangaStar Work Lights are the ultimate portable solution for professionals seeking versatile, high-performance lighting.

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https://nightsearcher.co.uk/products/kangastar-4-5k
KangaStar 6.5K £138.00 RRP
https://nightsearcher.co.uk/products/kangastar-6-5k

News in Brief

ZF Aftermarket further expands product range with 141 new parts

▶ **ZF Aftermarket** has introduced 141 new parts across its product ranges in the UK, enhancing its already comprehensive vehicle coverage with an additional 3142 vehicle references covered. Under the esteemed Lemförder brand, 22 new parts have been added, including four engine mountings, three control/trailing arm mountings, and two wheel suspension repair kits. In the trusted SACHS portfolio, 82 parts have been introduced. This includes 45 shock absorbers and 11 clutch kits, as well as six flywheels and nine drive cab suspension shock absorbers. Meanwhile, TRW has added 15 new parts, which consist of three brake calipers, five brake discs, and one wheel brake cylinder. The lineup also includes a wheel speed sensor, a brake pad set, a balljoint, a brake hose, and both a clutch slave cylinder and master cylinder. Finally, BOGE has introduced 22 new parts, featuring one suspension strut support mount and 21 shock absorbers. The extensive portfolio guarantees that customers can access OE-quality parts, spanning clutch, transmission, braking components, and numerous spare parts. All parts from Lemförder, SACHS, TRW and BOGE can be accessed via ZF Aftermarket's online catalogue system https://aftermarket.zf.com/en/

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Type the above into a browser address line and NOT a search engine

Car Mechanics *magazine will only use the data you supply on your entry to contact you if you are the winner. The winner's details will be passed on to Clarke International Ltd for the sole purpose of organising the delivery of your prize. All competition entries will be held securely until the prize draw has been made and then securely disposed of within seven days of the winners being chosen. The winners' details will be held for a period of one month until the prize has been dispatched and received, then they will be securely disposed of.*

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Martyn Knowles, Editor

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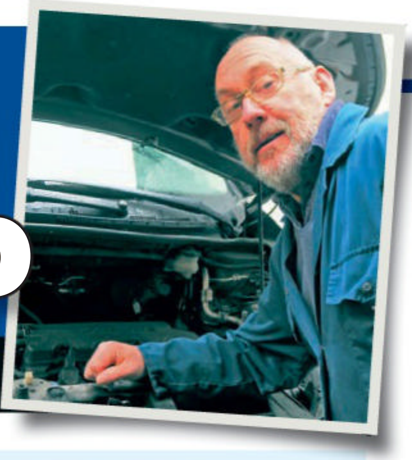
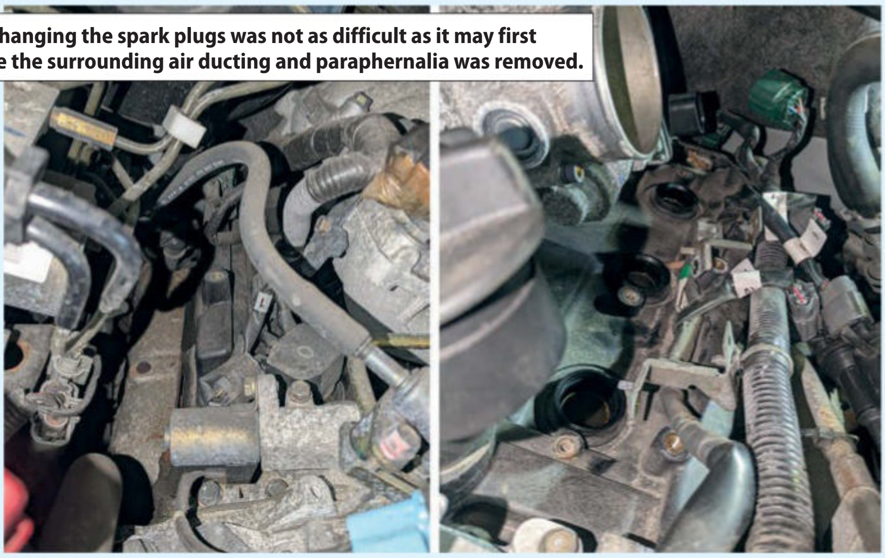
Tales from the workshop

Fixing advice from our garage proprietor **Steve Rothwell**



NISSAN ELGRAND

Spark plug change



The job of changing the spark plugs was not as difficult as it may first appear once the surrounding air ducting and paraphernalia was removed.

▶ Changing the spark plugs on this 2006 Nissan Elgrand was expected to be a bit of task. The 3.5-litre V6 engine had seen little attention since the Nissan was imported from Japan three years ago, and although it had been running smoothly, the owner had only had the oil changed since taking ownership of the motor.

The Nissan had now developed a little stutter under load and so they had decided that perhaps the plugs and air filter should also be looked at.

Surprisingly enough the air filter was quite clean, and I think this must have been replaced not long before the motor had left Japan. As with most 'V' engines, one side is always a little trickier than the other and, in this case, the right bank took a little longer than the left bank.

The job at first looks quite daunting, but once some of the induction pipes and ancillaries are removed the job is not too bad. The limited access does require several short extensions to use with the spark plug socket, but with the correct extension, the plugs can be removed and refitted with little effort.

AUDI TT

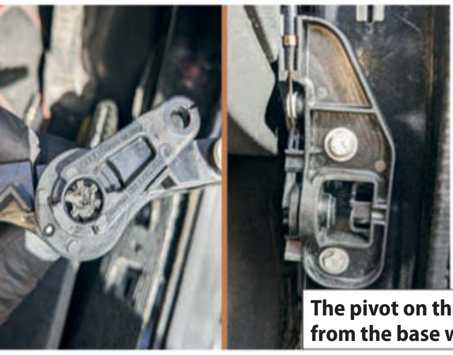
Bonnet pull failure

▶ It does seem to be more common now for motorists to neglect any underbonnet checks, with the consequence that the bonnet is not opened from one year to the next, when either the MOT or the annual service (if the motor is lucky), takes place.

The bonnet of this 2011 Audi TT 2.0 TFSI, had been opened a few times since it was last in the workshop, and the owner had noted that the bonnet release was now very hard to pull. He was concerned that the amount of effort needed to release the bonnet was going to break the bonnet pull handle.

This was actually a two-fold problem – the first part of the repair involved lubricating the bonnet catch to lighten the load on the release handle. The second part required the handle to be replaced, as the pivot was worn, and the handle was pulling awkwardly increasing the effort needed.

Replacing the handle involves removing the side trim panel, and once this was off and the handle renewed, the bonnet release system was much easier to operate, and a gentle pull on the handle was now enough to pop the bonnet open without any effort.



The pivot on the pull handle was worn and parted from the base when removed from its fixing.

SAAB 9-3

Steering leak

▶ The owner of this 2003 Saab 9-3 had been concerned by a damp area around the power steering reservoir. Although the problem was not extensive, it was continually showing a damp patch on the outside of the reservoir. The owner would clean this off using a small amount of degreaser and then wash it off, but after a few days the damp patch would return.

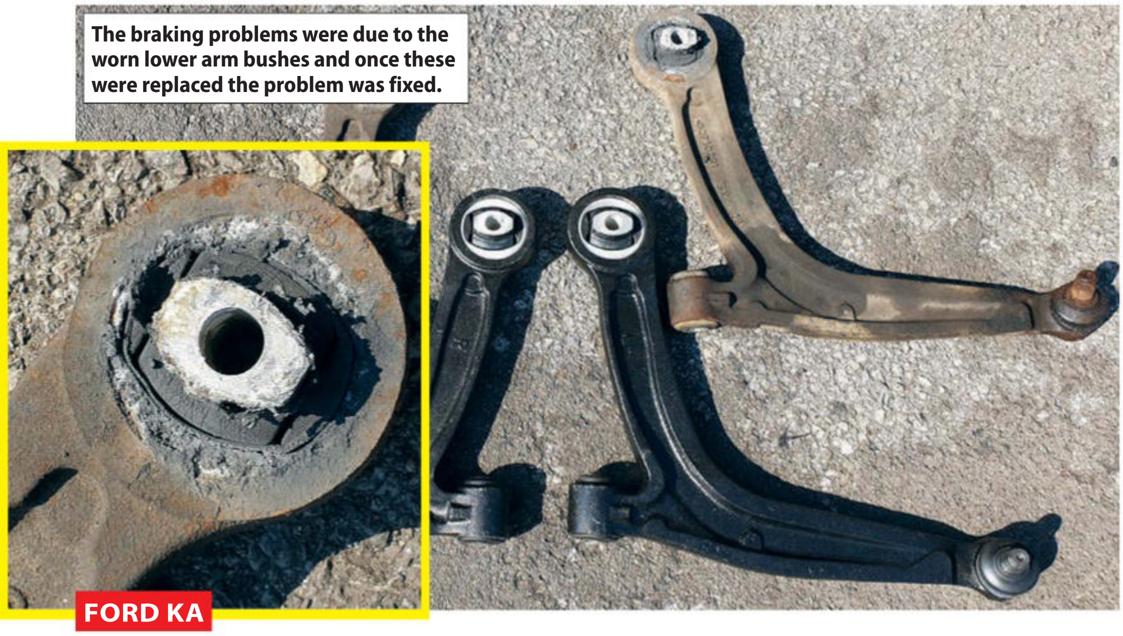
It did not take too much investigation to realise that the body of the reservoir had split along the seam, but the problem was getting the replacement part. Saab parts are still readily available but there are limits to what can be obtained.

The power steering pump is easily obtainable, and this comes complete with the reservoir, but as the pump itself was in good condition the owner was not too keen on spending the £300 being asked for a new pump complete with reservoir.

Amazingly while the round reservoir which fits the 2.2 diesel was readily available, finding the one for this engine took a little more effort. Finally a local breakers came through with the needed reservoir and for the barging price of £15.

This was fitted and washed down. Now the Saab owner could lift the bonnet and not be disturbed by an oil stain.

The thin layer of oily residue that kept returning was a clear indication that the reservoir was leaking, but obtaining the new part was the biggest challenge.



The braking problems were due to the worn lower arm bushes and once these were replaced the problem was fixed.

FORD KA

Worn bushes causes braking bother

▶ The owner of this 2011 Ford Ka 1.2 had felt a bad brake pull when coming to a stop at a faster pace than they had intended. After this incident they began to feel that the steering was not quite as positive as it used to feel, and so they asked me to have a look.

Checking the brakes they were to be found in a good condition and there was certainly nothing wrong in this area. The next step was to have a look at the suspension, and it was at this point that I discovered that the lower arm rear bushes were in a poor condition, and this was the cause of the braking problems the owner had felt.

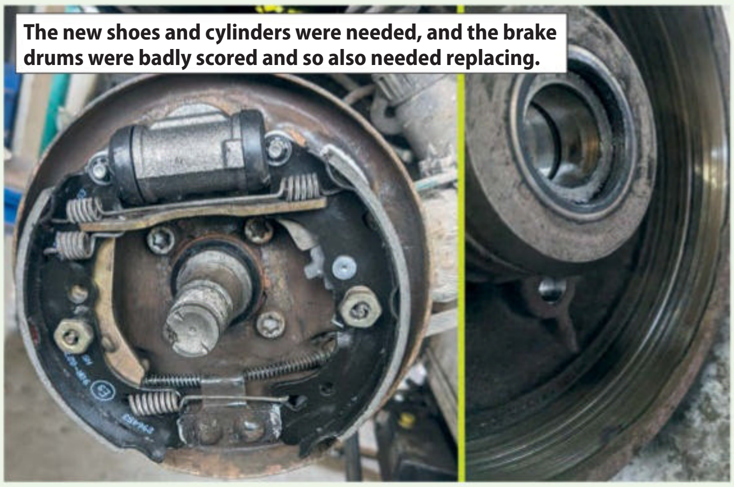
Both lower arms were in an equally poor condition and as the bumper must come off to access the front and remove the stabiliser arm blocking the front lower arm fixing bolt, it made sense to renew both.

Once the old arms were removed, the condition of the rear buses was seen to be poor, and so this was a worthwhile job.

With both new arms in place and the motor given a quick road test, the result of sharp braking now resulted in the motor stopping in a straight line without any pull to either side.

PEUGEOT 106

New shoes



The new shoes and cylinders were needed, and the brake drums were badly scored and so also needed replacing.

▶ The handbrake on this 2000 Peugeot 106 1.1 had been poor for a little while, and the owner remarked how it was coming up high and needed quite a tug to ensure that the motor did not roll when parked.

When removing the brake drums, it was then also noticed that there was a liberal amount of damp around the back plate. With the drum off it could be seen that not only were the brake shoes badly worn, with metal showing at the edges, but the slave cylinders were also leaking. This was possibly due to the amount of travel that was now needed to apply the brakes.

Looking into the brake drums, it was also decided that if new shoes and cylinders were going to be fitted, then new drums should also be added to the list. These come complete with the hub bearing and so are a little more costly, but it was worth it.

The old parts were stripped off and the back plates cleaned up, before the new slave cylinders and shoes were fitted. With the new brake drums in place the brakes were bled out and the handbrake adjusted on the cable.

The owner was impressed by the different feel of the brakes, which helped soften the blow of the bill.

Follow Steve on Twitter: www.twitter.com/cmtips

HONDA CIVIC

Oil seal leak

▶ Possible due to the improvement in the materials used, it does appear that leaking oil seals are far less common than they were a few years ago. The material of the modern seal does last and appears to continue doing the intended job.

The front crankshaft oil seal on this 2005 Honda Civic 2.0 Type R had though begun to weep, and as we all know, no one wants oil dripping from the engine.

Although quite a simple job, the replacement of the oil seal should be done with great care, and I can confirm that I have in the past replaced an oil seal only to see the new one leaking due to a slight distortion on fitting.

The secret is always to use the proper tool to ensure that the seal is located and fitted squarely, but sometimes the correct tool needs to be substituted with an alternative.

Thankfully with good access and the correct size adapter to push the seal into place, this one was fitted without further problems. Once the job was completed it only required the engine oil level to be checked before sending the leak-free Honda back out onto the road.

Once the crankshaft pulley was removed there was plenty of room around the seal to remove it and carefully fit the replacement.

VOLKSWAGEN GOLF

Oil leak

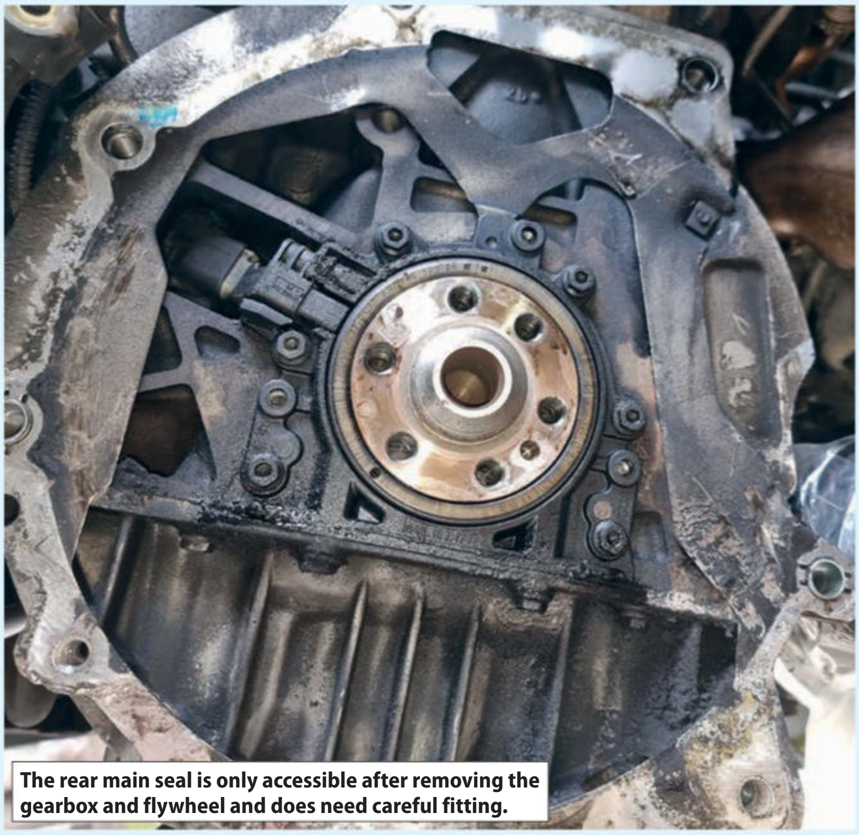
From the colour of the drip of oil at the base of the gearbox bellhousing, the oil leak on this 2008 VW Golf 1.9 TDI was going to be from the engine side of things. The dirty black oil was evidence enough that this wasn't transmission oil.

The gearbox needed to come out and once removed, the flywheel was taken off to expose the back of the engine. At this point the source of the leak was quite easy to see, and the black oil was coming from the area of the rear main oil seal carrier.

This looks quite a simple seal to change as the carrier can be unbolted from the back of the engine, but the size of the seal means that it is quite delicate and if not refitted correctly the seal is easily damaged.

The tool is part number T10134, and this ensures that when the seal and carrier is fitted it aligns correctly without placing strain on any single area.

With the new seal and carrier fitted and the flywheel back in place, a new clutch was fitted before replacing the cleaned gearbox and boxing the job up.



The rear main seal is only accessible after removing the gearbox and flywheel and does need careful fitting.

FORD FOCUS

Sticky brakes

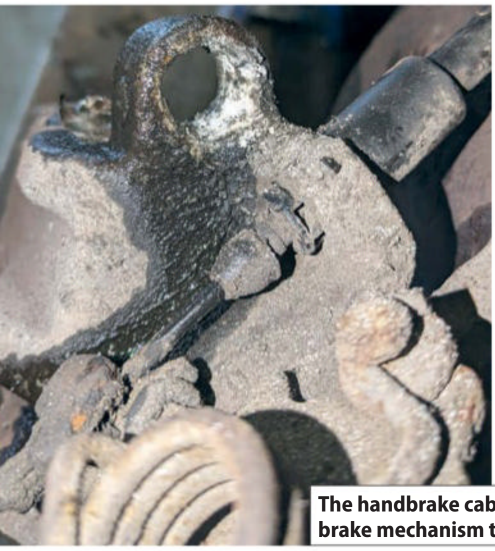
The owner of this 2007 Ford Focus 2.5 ST could detect the burning smell of the sticky brake and a quick check on the temperature of the wheels soon confirmed that the problem was on the rear. Ensuring that the handbrake was fully off, which it was, the Focus was booked in for attention. The binding brake would not only reduce the efficiency of the brakes as they heat up but will cause the Focus to use excessive fuel.

Once the ST was up on the ramp, the wheels were given a quick spin, and the offending caliper was soon discovered. With the relevant wheel off, the handbrake lever was checked and this was found to not be returning fully to the off position.

Disconnecting the handbrake cable, did allow the lever to return and also allowed the disc to suddenly spin freely.

A new handbrake cable was needed and due to the damage already done to the overheating brake pads, these were also replaced.

With the new cable on and adjusted up, and with the new brake pads fitted, the handbrake was checked to ensure that it was now freeing-off fully when released. This was the case and so I was happy to allow the Focus ST to go back on the road, safe in the knowledge that the brakes would no longer be binding.



The handbrake cable was causing the parking brake mechanism to stick and the brakes to bind.

CITROËN C4

ELOYS fluid change

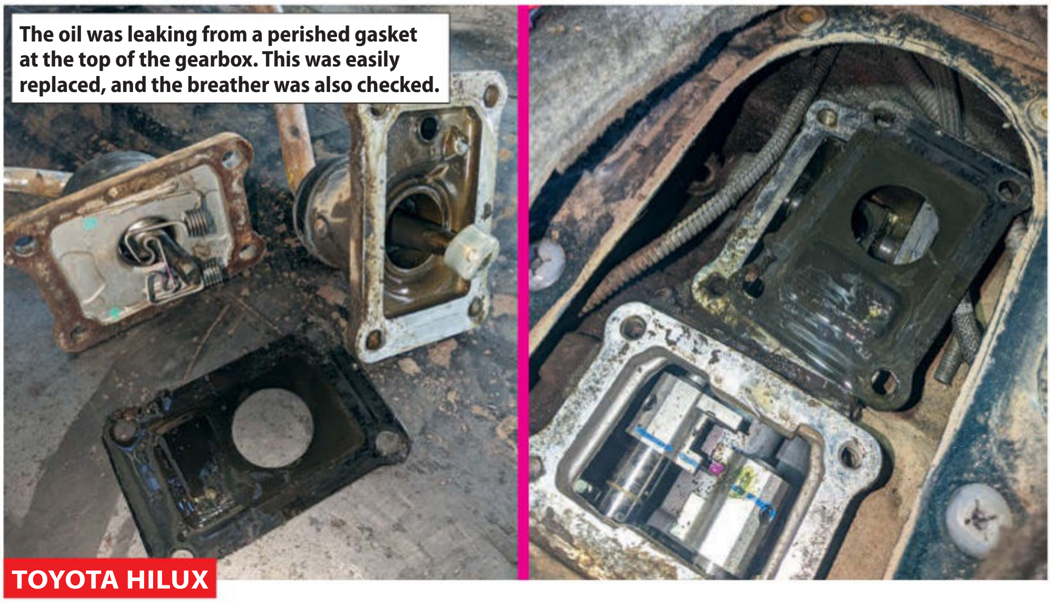
There are two types of diesel additive systems that are in use. The AdBlue type system which injects the additive into the diesel particulate filter and the ELOYS (PAT) fluid type which injects the additive into the diesel to aid in the regeneration of the DPF.

The ELOYS fluid unlike the AdBlue – which is a non-toxic mixture of urea and de-ionised water – is a more toxic blend of a cerium/iron-based solution. The advantage of this type of additive system is that it normally lasts between 50-70,000 miles. I have known owners come in with this type of system questioning the display of the DPF additive warning message, unaware that their vehicle even has such a system.

This Citroën C4 had now covered 82,000 miles and this would have been the first replacement needed. The bag system is easier than some that are fitted with a tank that needs to be refilled, and so this is quite a clean and simple job. It does require the system resetting with diagnostic equipment after completion.

The other downside is the cost of the bag of fluid, which is around £120, but considering the miles that can be covered on one bag of fluid, this is good value.

The bag system is a clean and easy option and after removing the empty bag and fitting the new full bag, the counter needs to be reset using diagnostic equipment.



The oil was leaking from a perished gasket at the top of the gearbox. This was easily replaced, and the breather was also checked.

TOYOTA HILUX

Leaky gear selector from perished gasket

▶ Gearbox oil has a sweet sickly smell which in my opinion is not pleasant. This 2011 Toyota Hilux 2.5 D had left a couple of drips of oil beneath the centre of the vehicle when parked and the owner had asked me to locate the problem. With the Toyota up on the ramp, my nose led me straight to the gearbox where the damp sickly oil was spotted. The job now was to locate where the oil was originating from.

As there was not a coating of oil on the underside, I dismissed the possibility of the propshaft output drive being the culprit and decided to look from above.

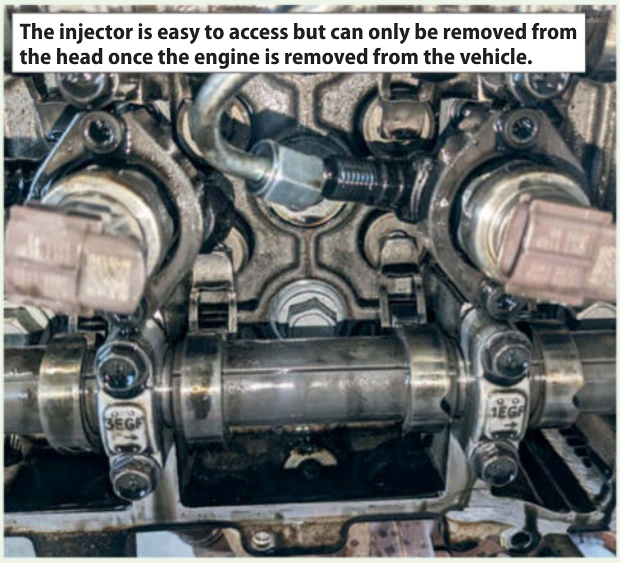
Removing the gear selector gaiter to access the top of the gearbox, the sight of oil trickling from the selector housing was all the evidence I needed. The selector housing is easily removed and once off I could see that the old gasket had perished, and this was allowing the oil to leak from the gearbox.

Ensuring that the breather on the top of the housing was clear, the gaskets on both the gear change and four-wheel-drive lever were replaced and the excess oil washed away.

Topping up the gearbox with a suitable 75W-90 oil, the job was complete.

SUBARU IMPREZA

Injector change



The injector is easy to access but can only be removed from the head once the engine is removed from the vehicle.

▶ Missing a beat this 2010 Subaru Impreza 2.0 diesel, was not running too smoothly. With the engine management light on and the code P0203 showing up on the scanner, the first check was to ensure that the engine loom and the connecting plug were in good order.

Being the flat-4 engine makes the injector change a little difficult and the book time given for all four is 12.7 hours. This is because the engine needs removing from the vehicle to allow the required access.

With a job like this it is vital that I was confident that the injector was going to be the source of the problem before starting out on the engine removal, and so I quickly checked the multiplug to the ECU and the condition of the loom, before confirming that the injector was the problem.

Once confident that this was the issue, the task of removing the engine began. Once out and with the cam-cover removed, the actual task of renewing the injector was easy.

It was then just a case of refitting the engine and bleeding through the cooling and fuel systems before firing up the Scooby to ensure that all was now well. With the codes cleared and the engine running smoothly, our job was done.

MERCEDES-BENZ E-CLASS

DPF problems

▶ One of the biggest problems with a modern diesel is the faults that can occur flagging up a diesel particulate filter (DPF) fault. The diesel engine as a unit will run on without problems for a good number of miles, but the downside to this reliable unit is that the exhaust emitted is not good for the environment, so a solution in the form of a diesel particulate filter was fitted. This is a good solution but as the filter fills up with the diesel particulates it then needs a system to clean these particulates out and regenerate the filter. This adds an extra layer of technical systems that can become faulty.

It is also the case that any fault in the system will prevent the regeneration taking place during normal driving and so this will escalate the problem.

The most common area of the problems as on this 2012 Mercedes E220 is the DPF pressure sensor. The code read on this Mercedes was P2454 indicating that the pressure sensor circuit was low – this was going to be an electrical fault or a sensor fault.

In many cases the problem can be due to a clogged sensor, but in the case of this Merc, the sensor itself had failed and once replaced the code cleared and all was well.

0 281 002 925
DC A 006 153 95 28
SD 0001 Made in Germany

The DPF pressure sensor was the source of the problem, and a new sensor was all that was needed to allow the DPF to operate as intended.

Project Volkswagen Caravelle

Final jobs

Part SEVEN:

Martyn Knowles follows the fitment of new front wheel bearings, plus other smaller items before our Caravelle heads off to France to live its next life.

Shorts in November! Yes, it was about 10°C when I started work on the roof. Those step-ladders saw plenty of action – I climbed them about 50 times during the painting of both roof rail gutters.

JOBS LIST

✓	ENGINE FLUIDS & FILTERS	Part 2 Aug 24
✓	RENEW BRAKE DISCS & PADS ALL-ROUND	Part 2 Aug 24
✓	DIRECT SHIFT GEARBOX (DSG) OIL & FILTER RENEW	Part 3 Sept 24
✓	RENEW REAR SHOCK ABSORBERS	Part 3 Sept 24
✓	CHANGE TIMING BELT & WATER PUMP	Part 4 Oct 24
✓	SORT BODYWORK ISSUES	Part 5 Nov 24
✓	FIT A NEW DUAL MASS FLYWHEEL	Part 6 Dec 24
✓	FIT NEW FRONT WHEEL BEARINGS	Part 7 Jan 25
✓	FIX NON-WORKING REAR AIRCON	Part 7 Jan 25
✓	TREAT RUST ON ROOF	Part 7 Jan 25
✖	REFRESH PAS FLUID	
✖	FIT NEW RUNNING BOARD STEPS	

Well, this is the final episode of our high-mileage VW Caravelle 2.0 TDI 140. The Transporter T5.1 six-seater is in remarkable condition inside and out considering the 202,000 miles it has covered, mostly with the two owners before us.

We were now working to a deadline to finish the few small jobs on our list, as the owner of our Caravelle, Ian Cushway, – fellow journalist and editor of *VWt* magazine (**https://shop.kelsey.co.uk/vwt-magazine**) – was coming over from his home in France to collect.

A spanner in the works which could potentially prevent me from working was the approaching Storm Bert – I needed to paint the roof rail gutters (outside in calm conditions). The other issue – the outside mid-afternoon temperature was about to drop to below 7°C!

I did manage to take off the roof rails and proceed, but I must admit I'd have done a better job in better conditions. The paint job was fairly involved. I didn't fully mask the whole roof either, when I really should have.

The rail gutters were rusty in certain sections, mainly near the front of the Caravelle. But I wanted to paint the whole gutter length. First job was to apply a rust remover, then wash that off (applied three times), spray primer, paint and lacquer without the wind taking my spraying efforts too far from the target.

I was still working on the roof when Ian arrived – he had to endure the cold temperature while he watched me up a set of step-ladders trying to polish out some overspray.

Wheel bearings

During our time with the Caravelle, we've had to fix a few things, but that's what we do. New brakes, rear shocks, DSG oil change (twice), timing belt, full service and in the last issue the dual mass flywheel renewed. Although the Caravelle drove great, there was still a humming from the front end when the steering wheel was turned anything more than five degress left or right while above 20mph. We had a pair of front wheel bearings from febi bilstein to fit – to be honest we weren't 100% confident that new wheel bearings would cure the noise, but carried on regardless.

These VW bearings are Gen2 type. We had a Laser Tools bearing kit (p/n 5587) to use, which shows in the instructions that we need to use the 85mm diameter bearing clamshell that wraps around our front hub. Generation 2 type bearings are a combined bearing and drive flange (hub) which cannot be separated without special tools. The Laser Tools 5587 kit isn't cheap – its RRP is £1706.33.

Final tweaks

We also investigated why the rear blower wasn't working. It would power up using a probe, but then trip-out. The blower was worn – or the resistor was at fault. febi can supply both these parts, so I ordered them in. Also, one of our rear parking sensors had failed. I bought a replacement from AliExpress. Once here, I masked the body of the sensor, then primed, painted and lacquered the tip. It fitted OK, however, we found the next sensor along was now not working! I ordered another new sensor from Amazon on the Saturday afternoon, it was at my address by 1pm Sunday. By 3pm it was painted and ready to fit.

Unfortunately, we didn't fit the sleek new matt black running boards (Ian will hopefully fit those in his magazine) and we failed to replenish the PAS fluid. The cruise control also doesn't work.

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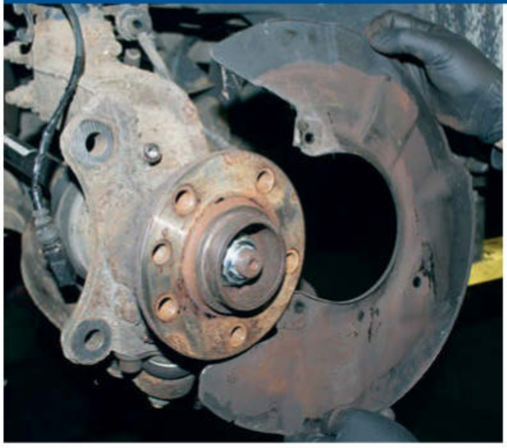
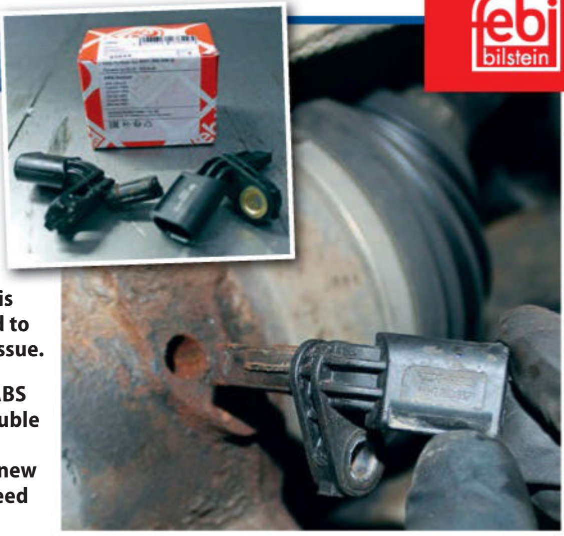
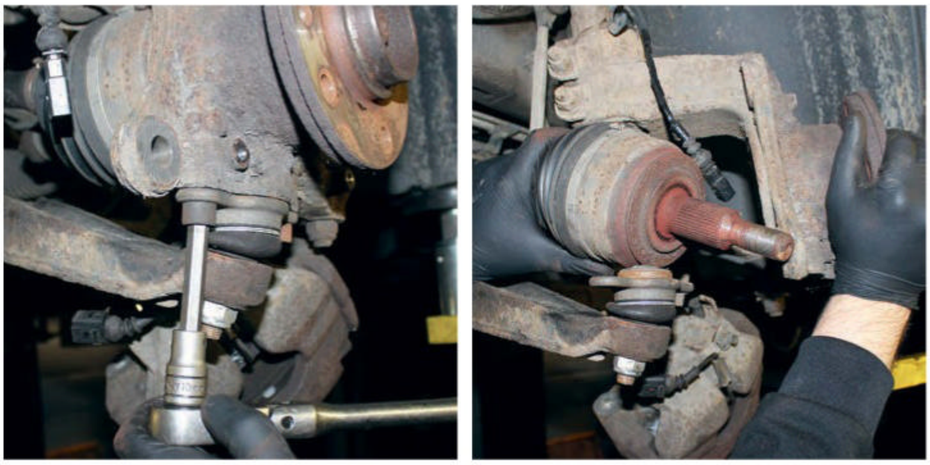
NEW FRONT WHEEL BEARINGS



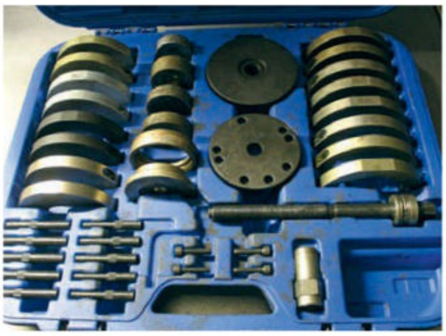
1 ◀ First, we need to remove the road wheel, undo the M10 set-screw for the front disc and with the disc off, undo the caliper carrier and remove that. The brake dust shield is next, held on with two 8mm bolts. New hub nuts are fitted from the febi kit. This is because we hit the originals hard to get the driveshafts out in the last issue.



2 ▶ We damaged the offside ABS sensor when we had that trouble removing the driveshaft in the last issue, so it was our intention to fit new sensors during this job – as they need to come out anyway.

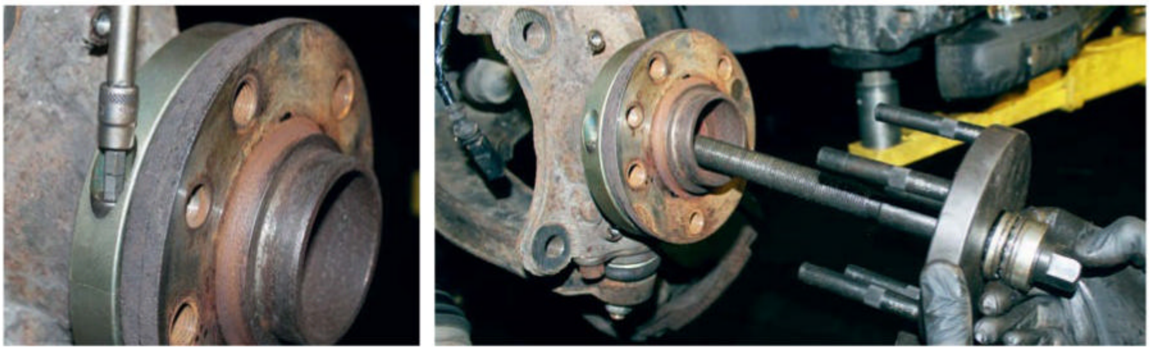


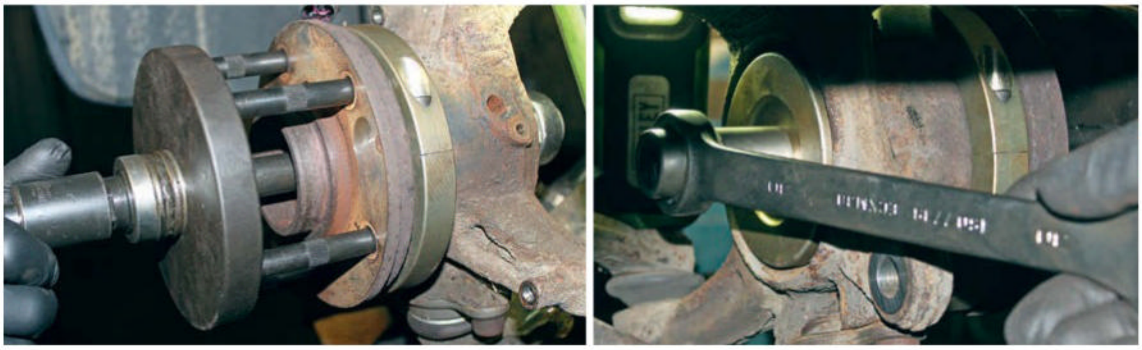
3 The hub nut can now be undone using a 30mm 12-sided socket. We leave it on the thread for now, while we undo the two 10mm Allen key bolts for the bottom balljoint. Once this is detached we can unscrew the hub nut, keeping it in a safe place. Then pull out the driveshaft from the hub assembly – which was easy to do this time as we had disturbed them during the DMF job.



4 The comprehensive GEN2 Wheel Bearing Kit from Laser Tools (5587) is for VAG vehicles including Audi A2; SEAT Cordoba/Ibiza; Skoda Fabia/Roomster; VW Fox/Lupo/Multivan/Polo/Touareg/Transporter. Suitable for 62, 66, 72 and 85mm wheel bearings. Our Caravelle requires the 85mm clamshells. Before we start we reattached the balljoint to give stability when removing the bearings.

5 ▶ The clamshells are in two halves. They are joined once placed around the hub by the screws supplied in the kit. Then the kit is made up as shown with a long threaded rod put through the centre of the hub.





6 ◀ The prongs fit into the wheel bolt holes. With the help of an assistant who is at the rear of the hub with a 30mm spanner and the back part of the kit fitted, the 22mm nut on the front is slowly wound clockwise.

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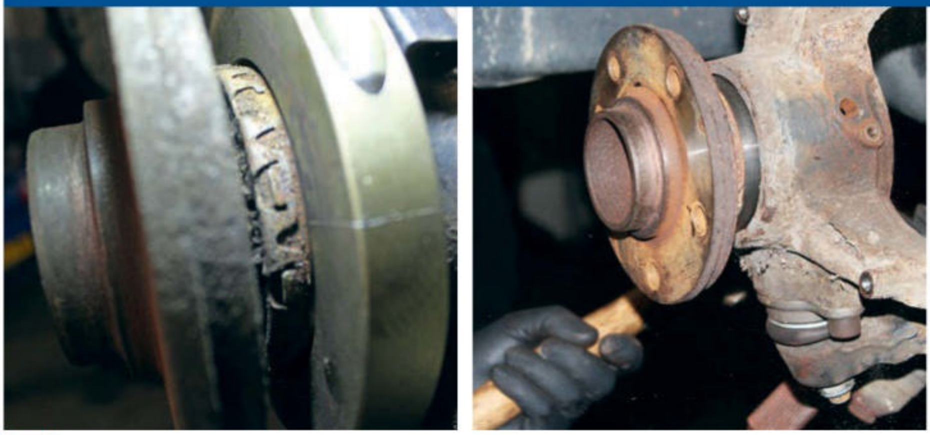
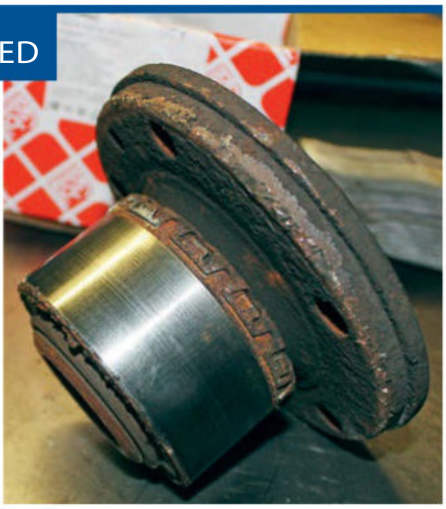
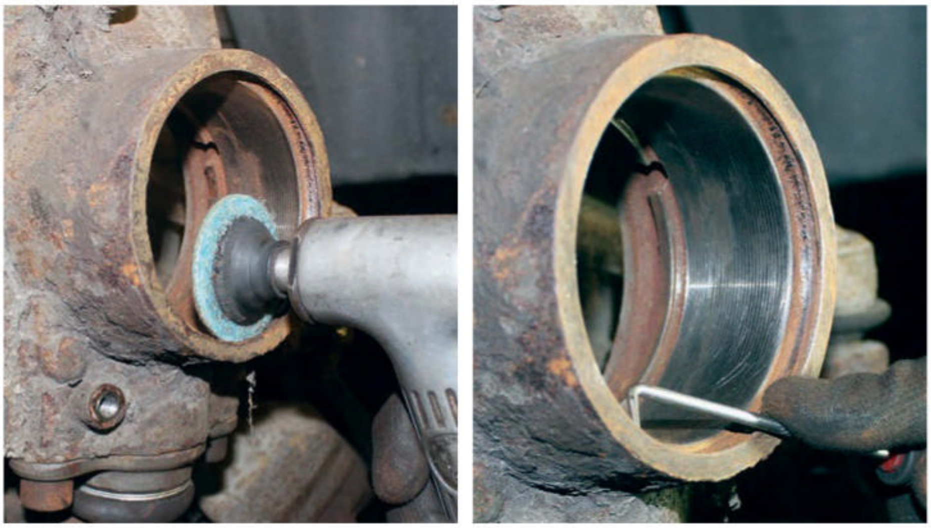
NEW FRONT WHEEL BEARINGS CONTINUED



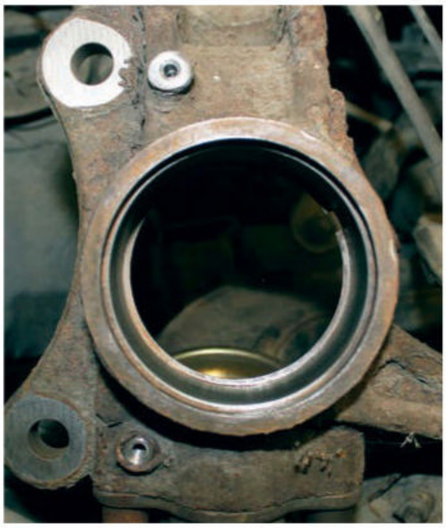
7 Slowly but surely, the bearing will start to move. There should be a loud crack as the bearing ring collapses, then you continue to wind the 22mm socket on the Laser 5587 until it will go no more. Brute force is needed next, because a substantial hammer (or two)...



8 ...will help drive the bearing from the hub – hitting the rear of the bearing evenly until it falls out on to the floor.



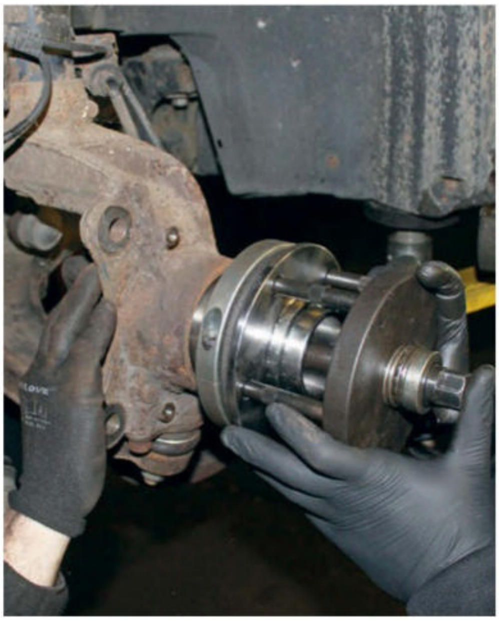
9 An important next step is to clean the outer hub where the original bearing had sat. It will be rusty and needs to be as clean as possible. We used the tools seen here, plus some emery cloth to make sure it was almost spotless. An airline finished the job by blowing out all debris.



10 We can see through the hub assembly where the bearing and driveshaft fit. Now to fit the new febi bilstein bearing.

11 ◀ Shop around for prices – Parts in Motion sell this febi 34800 wheel bearing kit (with wheel hub, ABS sensor ring and hub nut) for a reasonable £43.91 – it weighs 3.85kg and comes with a 3-year manufacturer guarantee.

12 ▶ The fitting procedure is fiddly. You have to align the new wheel bearing straight, using the small hammer to get it started in the hub assembly. Once satisfied, the Laser 5587 is used again, turning the 22mm nut clockwise to drive the bearing in. Once in place, the balljoint is taken off again, the driveshaft repositioned through the hub and the (new) hub nut tighten to 200Nm, loosen 180°, then tighten to 200Nm again. Now to do the wheel bearing on the other side. With the brakes refitted, the road wheels on and tightened to 180Nm, we went on a test run. Hurrah – that droning noise had disappeared. We were very pleased and I took the Caravelle for an extended run the next day – it was a pleasure to drive.



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Continued on page 30

MOTUL

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NGEN4
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ACEA A3/B4
REGENERATED BASE
MOTOR OIL
MOTUL
1L
NGEN6
ECO DESIGNED MOTOR OIL
SAE 5W-30
API SP
ILSAC GF-6A
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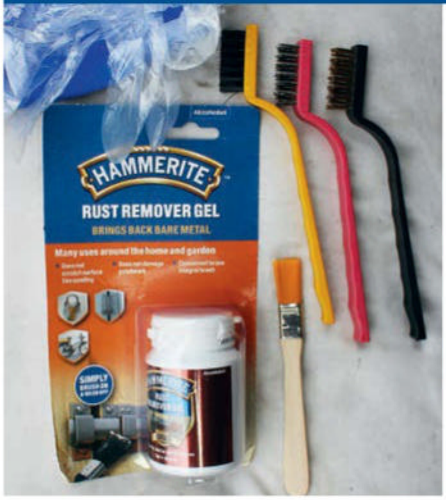
MOTUL

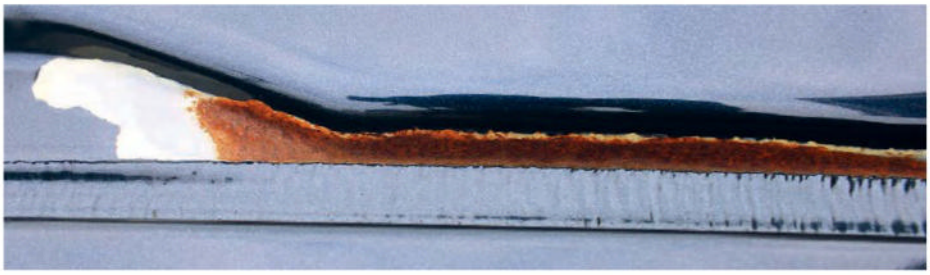
PAINTING THE ROOF GUTTERS



1 The Caravelle has some rusty patches under the aftermarket roof rails. I wanted to paint each gutter after removing as much of the rust as possible. To help me, I bought this Hammerite Rust Remover Gel kit from Amazon for £17.99 delivered.

2 ◀ With the roof rails taken off, along with their brittle plastic/rubber cushion pads, it was time to clean up the gutters first with a damp cloth to remove accumulated dirt, followed by a heat gun.

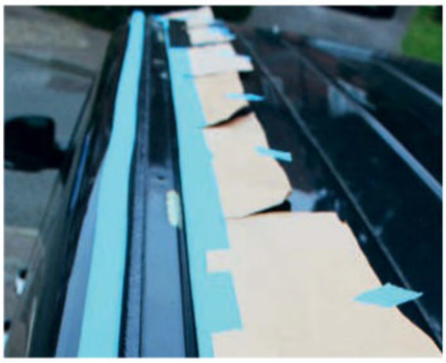
3 ▼ This is the sort of rust we had to deal with. Just surface rust, but it needs treating now. Of course, it is mostly out of sight being up so high, but I wanted it looking better than this. First the Rust Remover Gel was applied to the rust, left to soak for 20 mins, before washing off with a damp cloth. A dry with the heat gun, before doing the same procedure another two times. The rust slowly disappears as you go – and you can keep going until it is all clear.



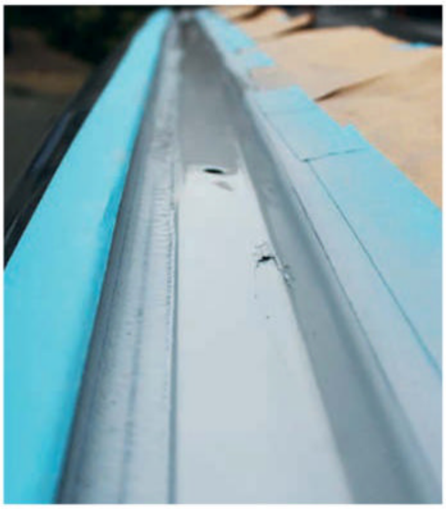
4 Prior to applying the Rust Removal Gel, I went around all the areas without paint with the supplied wire brushes.

RUST REMOVER GEL

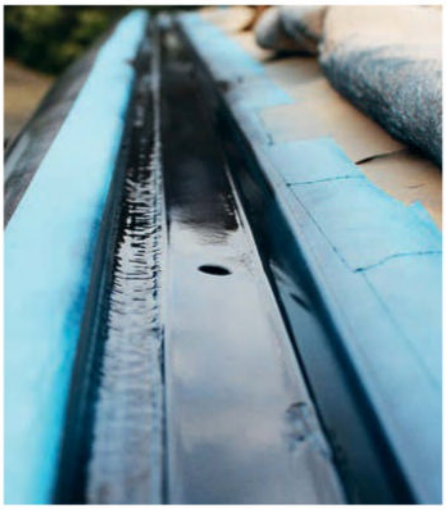
5 The Gel works well on surface rust like this. You leave it to soak before wiping off the rust with a damp cloth.



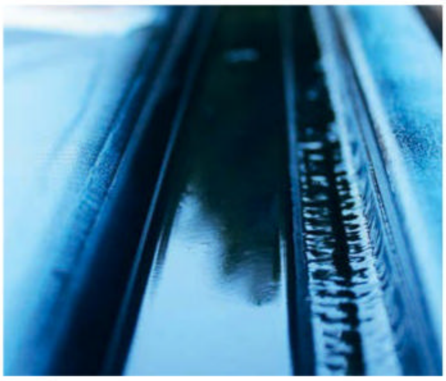
6 My masking wasn't the best, but I did importantly use low-tack tape. This was left out overnight, with Storm Bert approaching. Fortunately, it stayed intact.



7 A grey primer spray can, bought from Halfords, went on first. Half an hour drying before a second coat. The heat gun quickens drying times, though.



8 I bought a spray can of Night Blue paint via the internet from PaintNuts. They mixed up the colour from the Caravelle's registration number. Two coats went on.



9 Finally a clear lacquer to finish. Two coats of this. Now to repeat this procedure on the other gutter. After the rain had stopped, the masking tape came off. There was residue left, so I went at it with a cordless polisher. Ian had arrived, so we only had time to refit one roof rail before it started snowing! I had to leave the other rail in the back of the Caravelle for Ian to fit at a later date.

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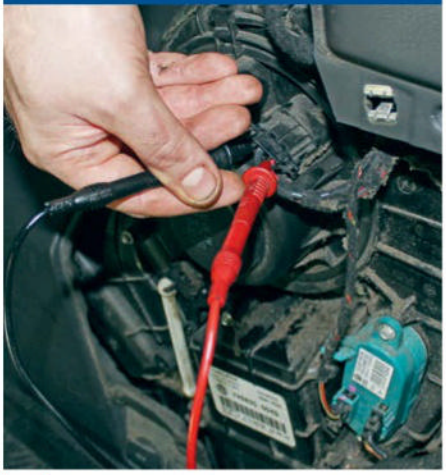
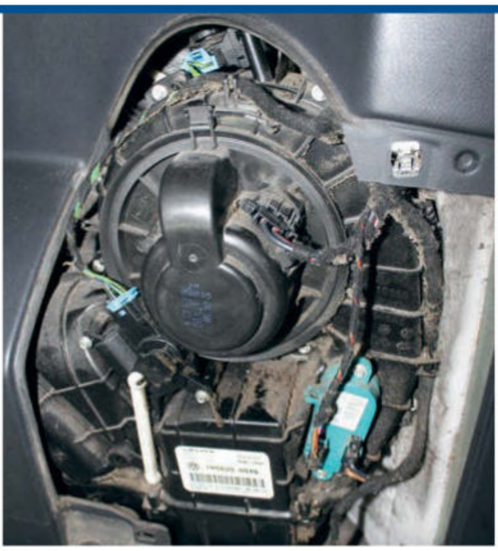
REAR BLOWER



1 The aircon is ice cold in the Caravelle. However, rear passengers should be able to regulate the temperature themselves via an overhead digital operating panel and roof vents. Unfortunately the rear blower motor doesn't work. It's located in the offside rear load compartment, along with a resistor to control the blower speed. Powering up the motor with a test probe showed that it tripped-out after a few seconds – we need a new motor.

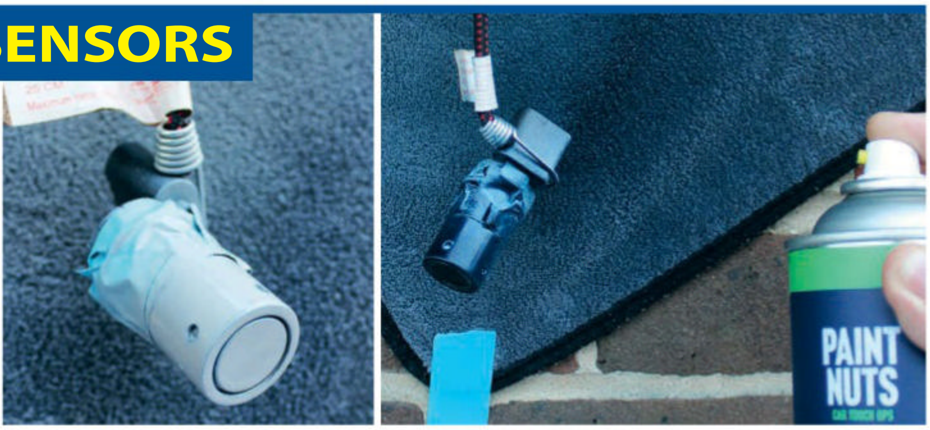


2 It easy to extract the motor – twist it left and it will come out after releasing its electrical connection. febi bilstein supplied us with a new blower motor and a new resistor (which is held in place by two 8mm bolts). With the new items in place, the rear blower still didn't operate. Our technician, Lee, then spent much time trying to find why we didn't have a 'live' feed. First we checked two 40-amp fuses under the front passenger seat, then a 40-amp fuse under the driver's side dashboard. None had blown, so Lee had to look harder at circuit diagrams. We had to stop searching that night due to time restrictions, but Lee continued the day before Ian arrived. Sadly, Lee couldn't get to the bottom of it in the time given. Hopefully Ian can find an answer in France.

REAR PARKING SENSORS

halfords
Plastic
Pre-Primer
Clear

1 The cheap parking sensors arrived in black plastic. To get them sprayed in Night Blue, I first masked up the base. My first sensor was painted in my makeshift booth (outside) – a cloth protected the wall and a small bungee cord hooked around the sensor, hung to another bungee, which was tied to an outside lamp. Shopping at Halfords, I bought a plastic pre-primer clear. A bit overkill really as a normal grey primer would be sufficient.



2 In fact, I did use a grey primer as well, before applying the PaintNuts Night Blue paint via the spray can. Once dry after 30 minutes, clear lacquer was added.

3 Lee arrived to fit the newly painted sensor – we gave him some pillows to rest his head while lying on the ground. The sensor worked fine. However, we found the one next to it now wasn't working! A quick order to Amazon and we had a new one the next day. I created a different spray booth this time as the wind was noticeably stronger. I pierced a hole in a spare cardboard box and inserted the sensor, spraying the tip with a primer, top coat and lacquer. With this new sensor fitted, we now had full front and rear parking sensor chevrons on the dashboard. Perfect!

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BON VOYAGE

Ian Cushway (left) takes delivery of the Caravelle keys from Editor Knowles.

BIG is beautiful

says Ian Cushway

▶ I am not sure if editor Martyn thought I was kidding when I immediately set off on the wrong side of the road in the Caravelle. You see I live in France – I'd got the plane over to fetch the T5.1 and was set to catch a ferry back home a few days later so it could enjoy a new life with me and my family across the Channel.

Having corrected myself, a rather ashen faced Martyn directed me to an open stretch of road, the Transporter shifting seamlessly through the gears as I accelerated. It's the first time I've driven a DSG transmission, and I have to say – I was impressed with its smoothness.

I like the lofty driving position in the Caravelle and the visibility is very good too, despite the darkly tinted rear windows. It took me a while to get used to its size, though, as our other car is a Volkswagen Polo Mk6.

Thanks to the work done on the front suspension, the ride felt good and the vehicle seemed to soak up the potholed Kent roads well with nothing in the way of knocks or bangs. For a vehicle that is essential a 'commercial', it's impressively refined. Likewise, the brakes were excellent. Being in such brilliant condition bodily, it was difficult to believe I was piloting a 14-year-old vehicle with over 200,000 miles under its belt.

16:02 D7
Since start
Fuel economy
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6.5°C
96km/h
miles
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trip
244.5

In somewhat atrocious weather I said goodbye to Martyn and made my way cross country to Canterbury, then the next day back towards Dorchester, the latter involving lots of motorway driving. At cruising speed, the Caravelle was super comfortable, aided of course by the heated front seats which kept my rump nice and toasty. The best average fuel economy I achieved was 39mpg which I didn't think was too bad considering the vehicle's proportions.

On that note, having finally got back to France, I am embarrassed to admit I misjudged the reversing manoeuvre onto my single drive and clipped the generously sized door mirror on the gate. Fortunately, the glass didn't break and I've managed to pull it back into position, but it's made me a bit more careful when negotiating tight parking spaces.

There's a few jobs still to do on the Caravelle, and I'd love to get to the bottom of the non-functioning cruise control and rear blower, but for now I am chuffed with it and can't wait to use it for everyday use and longer European journeys.

PROJECT COSTS

PARTS COSTS

Engine oil x 8 litres (febi 32946)	**£92.00**
Engine oil filter (febi 36634)	**£7.75**
Sump drain plug (febi 48871)	**£5.30**
Fuel filter (febi 26950)	**£28.83**
Air filter (febi 32244)	**£8.98**
Cabin filter (febi 21316)	**£6.95**
Brake discs front pair (febi 28504)	**£84.02**
Brake pads front (febi 16462)	**£28.53**
Brake discs rear pair (febi 28682)	**£60.84**
Brake pads rear (febi 16860)	**£23.13**
Pad fitting kit front (febi 181911)	**£9.38**
Pad fitting kit rear (febi 181919)	**£11.80**
DSG oil x 5 litres (febi 39071)	**£74.35**
DSG oil x 1 litres (febi 39070)	**£18.95**
DSG filter (febi 107342)	**£21.89**
Rear shock absorbers x 2 (GT Automotive)	**£76.80**
Rear lower spring cup bush x 2 (Polybush 44FF)	**£47.50**
Timing belt kit (febi 37021)	**£96.55**
Water pump (febi 36048)	**£31.62**
Auxiliary drive belt (febi 28952)	**£12.44**
Coolant G12++ 1.5l (febi 37400)	**£18.91**
Brake pad wiring repair	**£54.00**
High-level brake light	**£46.80**
Kumho tyres x 4	**£377.92**
Paintwork repairs	**£960.00**
DMF (Sachs)	**£432.00**
Mechatronics sump cover	**£78.60**
Wheel bearings x 2 (febi 34800)	**£87.82**
ABS sensor x 2 (febi 23822)	**£20.24**
Interior fan assembly (febi 106363)	**£78.08**
Blower Resistor (febi 176042)	**£56.93**
Rear parking sensor (AliExpress)	**£13.49**
Rear parking sensor (Amazon)	**£17.76**
Grey Primer (Halfords)	**£11.99**
Night Blue paint can & lacquer can (PaintNuts)	**£34.97**
Hammerite Rust Remover (Amazon)	**£17.99**
TOTAL PARTS	**£3055.11**

USEFUL CONTACTS

bilstein group partsfinder
partsfinder.bilsteingroup.com

Vasstechnik vasstechnik.co.uk

The Editor gives Ian a test drive before he takes over. The Caravelle now drives spot on after that horrible wheel bearing noise has disappeared. The aftermarket infotainment system also works a treat. We can see from the sat-nav's previous journey history, that our T5.1 did venture over to France on more than one occasion with the last owner.

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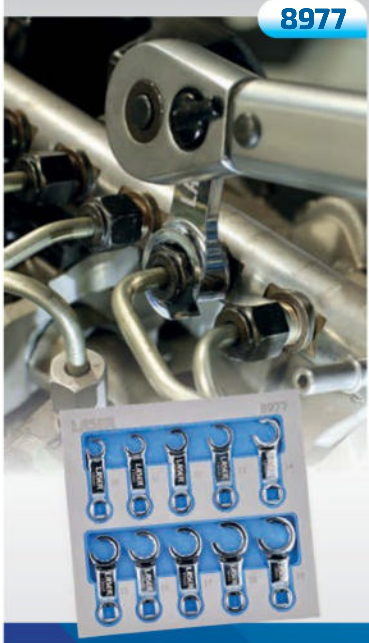

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CIG81212	3.6 x 3.6 x 2.5m	140613584	£249.00		£298.80
CIG81015	4.5 x 3 x 2.4m	140613570	£279.00		£334.80
CIG81216	4.9 x 3.7 x 2.5m	140613574	£319.00	£394.80	£382.80
CIG81020	6.1 x 3 x 2.4m	140613572	£349.00		£418.80
CIG81220	6.1 x 3.7 x 2.5m	140613576	£389.00	£478.80	£466.80
CIG81224	7.3 x 3.7 x 2.5m	140613578	£489.00	£598.80	£586.80
CIG1432	9.7x4.3x3.65m	140613594	£1099.00		£1318.80
CIG1640	12x4.9x4.3m	140613596	£2599.00		£3118.80

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TIGER 8/260

‡ WAS £131.98 inc.VAT

Model	Motor	CFM	Tank	Order Code	exc.VAT	inc.VAT
8/260‡	2HP	7	24ltr	000119490	£107.99	£129.59
11/550	2.5HP	9.3	50ltr	000119505	£169.98	£203.98
16/550	3HP	14.5	50L	000119510	£239.00	£286.80
16/1050	3HP	14.5	100ltr	000119515	£299.00	£358.80

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- Non-marking nylon wheels

CTJ1250AB

Model	Lifting Cap.	Order Code	exc.VAT	WAS exc.VAT	inc.VAT
CTJ1500QL	1.5T	020112633	£104.99	£131.98	£125.99
CTJ1250AC	1.25T	020111818	£129.98	£167.98	£155.98
CTJ2500QLGB	2.5T	020112803	£169.98	-	£203.98
CTJ1800AB	1.8T	020113202	£194.99	£239.98	£233.99

JUMP STARTS

EXTRA LONG 1M LEADS

JS4000

JS1224

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Model	Starts Engines up to	Peak Amps	Order Code	exc.VAT	inc.VAT
JS1100	3L	1100	010310017	£86.99	£104.39
JS1224LiN	6L	1200	010318905	£144.99	£173.99
JS4000	6L	2200	010311030	£164.99	£197.99
JS12/24	6L	2000	010311224	£179.98	£215.98

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	Model	Description	Order Code	exc.VAT	inc.VAT
1	CBB203C	3 Dr step up	070118012	£86.99	£104.39
2	CBB209C	9 Dr Chest	070118032	£154.99	£185.99
3	CBB217C	7 Dr Cabinet	070118057	£279.00	£334.80

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Model	Voltage	Heat Output	Order Code	exc.VAT	inc.VAT
Devil 6003	230V	1.5-3kW	010416003	£64.99	£77.99
Devil 7003	230V	3kW	010415450	£64.99	£77.99
Devil 7005	400V	5kW	010415452	£89.98	£107.98
Devil 6009	400V	4.5-9kW	010416009	£119.98	£143.98
Devil 7009	400V	9kW	010415454	£147.99	£177.59
Devil 6015	400V	5-10-15kW	010416015	£179.98	£215.98
Devil 7015	400V	15kW	010415456	£219.98	£263.98

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*Folds for storage

Model	Capacity	Order Code	exc.VAT	inc.VAT
CES340	340kg	020110124	£69.98	£83.98
CES450	450kg	020110121	£79.98	£95.98
CES560	560kg	020110123	£104.99	£125.99
CES680F*	680kg	020110122	£135.99	£163.19

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PG3800ADV

Model	Volts	KVA	HP	Order Code	exc.VAT	inc.VAT
PG2500A	230	2.2	5.6	010617850	£219.00	£262.80
PG3800A	230	3	5.6	010617852	£239.00	£286.80
PG3800ADV	230/110	3	5.6	010617854	£279.00	£334.80
PG6500ADVES	230/110	5.5	9.7	010617856	£529.00	£634.80
PG9000ADVES‡	230/110	5.5	16	010617860	£949.00	£1138.80

‡ WAS £1174.80 inc.VAT Honda engine models available

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IG2200A

Model	Max Output	Weight KG	Order Code	exc.VAT	inc.VAT
IG950D‡	800W	9.3	010617107	£209.00	£250.80
IG1700F	1700W	22	010617095	£249.00	£298.80
IG1200D#	1100W	12.4	010617112	£229.00	£274.80
IG3500AF	3400W	35	010617125	£359.00	£430.80
IG2200A*	2200W	26.6	010617121	£349.00	£418.80
IG4000●	3800W	-	010617130	£899.00	£1078.80

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Model	Motor (W) Speeds	Order Code	exc.VAT	WAS inc.VAT	inc.VAT
CDP5EB	350 / 5	060712030	£94.99	£119.94	£113.99
CDP5RB	350 / 5	060710035	£94.99	£119.94	£113.99
CDP102B	350 / 5	060715512	£109.98	£139.14	£131.98
CDP152B	450 / 12	060715522	£179.00	£250.80	£214.80
CDP452B	550 / 16	060715575	£299.00	-	£358.80
CDP352F	550 / 16	060715562	£319.00	£394.80	£382.80
CDP502F	1100 / 12	060715592	£689.00	£838.80	£826.80

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Model	Start Boost	Peak Boost	Order Code	exc.VAT	inc.VAT
JSM600	300A	600A	010319020	£49.98	£59.98
JSM1000*	500A	1000A	010319025	£59.98	£71.98
JSM1200‡	600A	1200A	010319030	£69.98	£83.98

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IMIG100NG	40-100	010115610	£149.98	£179.98

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Model	Max Amps Charge/ Boost	Order Code	exc.VAT	inc.VAT
BC125	20/120	010310125	£89.98	£107.98
BC190	38/180	010310190	£104.99	£125.99
BC210C	25/200	010311130	£149.98	£179.98
WBC180	35/180	010311500	£159.98	£191.98
WBC240	45/240	010311505	£184.99	£221.99
WBC400	60/350	010311515	£219.00	£262.80
BC520P	50/510	010311082	£259.00	£310.80

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CTJ2250LP

Model	Type	Tonne	Order Code	exc.VAT	inc.VAT
CTJ2L	Long	2	020110275	£42.99	£51.59
CTJ2250LP*	Low Profile	2.25	020113070	£49.98	£59.98
CTJ3000GB	Pro Garage	3	020113032	£109.98	£131.98
CTJ3000QLC	Pro Garage Quick Lift	3	020113210	£114.99	£137.99
CTJ2QLP#	Low Quick Lift	2	020111820	£152.99	£183.59

* CTJ2250LP has a 2.25 tonne capacity, has a low entry of only 80mm and includes 2 sockets ‡ WAS £191.98 inc.VAT

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Little Devil II	10.3	010416020	£89.98	£107.98
Devil 700	15	010410182	£114.99	£137.99
Devil 900	24.9	010410186	£159.98	£191.98
Devil 1600	36.6	010410190	£189.98	£227.98
Devil 2100	49.8	010410194	£249.00	£298.80
Devil 4000	131	010414000	£479.00	£574.80

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powered by Li-Ion

2x2AH

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‡ Auto Express Best Buy 2024

Model	Desc	Batteries	Order Code	exc.VAT	inc.VAT
CCIW160	Cordless	2X 2AH LI-ION	060210658	£99.98	£119.98
CIR 184LIP‡	Cordless	2X 4AH LI-ION	060210619	£144.99	£173.99

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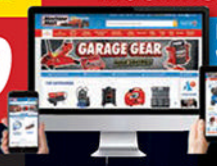

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◆ WAS £83.98 inc.VAT

Model	Disc (mm)	Motor	Order Code	exc.VAT	inc.VAT
CAG800B	115	800W	060512110	£29.98	£35.98
CON1150‡	115	1150W	060514015	£34.99	£41.99
CAG2350C◆	230	2350W	060512030	£64.99	£77.99

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Makes easy work for washing vehicles, patios, stonework, etc.

- JET7500, JET8500 & JET9500B include hose reel

180 Bar
2610 PSI

JET8500

FROM £59.98 exc.VAT £71.98 inc.VAT

Model	Motor W	Max. Press.	Order Code	exc.VAT	inc.VAT
JS1850	1400	1523psi	050416005	£59.98	£382.80
JS1950	1600	2030psi	050416011	£94.99	£113.99
Jet7500	1600	2030psi	050413510	£149.98	£179.98

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PGF14
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DH20L	20L/day	010410683	£149.99	£179.99
DH30L	30L/day	010410685	£169.99	£203.99
IDH50L	50L/day	010410611	£469.00	£562.80

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2.8KW
NEW
2850
2.8KW
2800PTC-B

Models	Max. Output	Order Code	exc.VAT	inc.VAT
DEVIL 2000PTC-B	2kW	010415591	£29.98	£35.98
DEVIL 2850	2.8kW	010415801	£42.99	£51.59
DEVIL 2800PTC-B	2.8kW	010415602	£49.98	£59.98

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- Extra-long run fuel tanks – up to 53 litres
- Variable heat output with thermostat control

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XR60B

Model	MAX output	Order Code	exc.VAT	inc.VAT
XR60B	14.7kW	010411103	£219.00	£262.80
XR110	29.3kW	010411006	£319.00	£382.80
XR160	46.9kW	010411008	£389.00	£466.80
XR210	61.5kW	010410210	£449.00	£538.80

HEAVY DUTY LONG REACH JACKS

FROM £269.00 exc.VAT £322.80 inc.VAT

CTJ2GLS

Model	Tonnes	Order Code	exc.VAT	inc.VAT
CTJ2GLS	2	020111026	£269.00	£322.80
CTJ3GLS‡	3	020113085	£349.00	£418.80
CTJ5GLS◆	5	020113090	£459.00	£550.80
CTJ10GLS	10	020113095	£639.00	£766.80

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Built for tough daily use in automotive/industrial workshops

* Available with/without 7 pce pin, bracket & pressing plate kit # Economy model

CSA30FP

‡ WAS £233.99 inc.VAT

Model	Order Code	exc.VAT	inc.VAT
CSA4B-4 tonne bench#	020413025	£169.98	£203.98
CSA10EP 10 tonne bench* ‡	020414025	£189.98	£227.98
CSA12F 12 tonne floor*#	020413020	£379.00	£454.80
CSA20FBT 20 tonne floor	020414058	£489.00	£586.80
CSA30FPB 30 tonne floor	020415201	£959.00	£1150.80
CSA50FPB 50 tonne floor	020415203	£1699.00	£2038.80

MMA & ARC/TIG INVERTER WELDERS

FROM £104.99 exc.VAT £125.99 inc.VAT

AT165
MMA200A

Model	Min/Max Output Current	Electrode Dia. (mm)	Order Code	exc.VAT	inc.VAT
MMA140A	20A-140A	1.6-3.2	010112161	£104.99	£125.99
MMA200A	20A-200A	1.6-3.2	010112163	£139.98	£167.98
AT165	10A-160A	2.5/3.2/4.0	010112149	£219.98	£263.98

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IBC20

Model	Tank Volume	Flow Rate Req.	Order Code	exc.VAT	inc.VAT
IBC7	12/24V	7A	010317008	£39.98	£47.98
IBC15	12V	15A	010317010	£49.98	£59.98
IBC20	12/24V	20A	010317012	£62.99	£75.59
IBC25	12/24V	25A	010317013	£79.98	£95.98
IBC40	12/24V	40A	010317014	£99.98	£119.98

PETROL & DIESEL PRESSURE WASHERS

PLS265B

FROM £269.00 exc.VAT £322.80 inc.VAT

Honda & Dieselengine models in stock

‡ WAS £814.80 inc.VAT

SPECIAL OFFER WAS £2998.80 inc.VAT - ends 31/12/2024

Model	Pressure BAR/Psi	Motor HP	Order Code	exc.VAT	inc.VAT
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XEV16/150(400V)‡	14cfm	150ltr	000112276	£699.00	£838.80
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Product Test

Rob Hawkins puts products through their paces

CORDLESS TYRE INFLATORS

We've been testing ten different digital, cordless tyre inflators to discover their speed and accuracy with maintaining air pressure in vehicle tyres.

One of the most versatile means of inflating a vehicle's tyre has got to be a cordless tyre inflator. Powered by a rechargeable battery, some use the same battery within a group of power tools, whereas others have an inbuilt battery.

The ten cordless tyre inflators we have tested are powered by an assortment of lithium-ion batteries that range from 3.7V to 20V. In theory, the larger the voltage of the battery, the more powerful the tyre inflator, but the amp hours (Ah) rating also matters. Take a look at our table of data and the time taken to inflate a tyre from 25psi to 30psi to make more sense of this statement.

Speed of inflation is often a major consideration when choosing a tyre inflator. If you intend to use such a machine for several minutes, then its duty-cycle may halt progress. This is the amount of recommended time it should be used before the motor needs to be rested to cool down.

Cordless tyre inflators often include lots of additional features, such as adaptors to inflate a football or different valves (not just the standard Schrader car tyre type), a torch and powerbank.

All the ones we tested could measure a tyre's pressure, which was displayed on a digital readout, although we were alarmed by the inaccuracy of some of those readings – some of the devices recommended using a separate pressure gauge to check a tyre's pressure. Most of them included an auto-inflate function, which means a target pressure for a tyre can be set, then the inflator left to pump air into the tyre, stopping automatically once that pressure has been reached.

Whilst we have chosen clear winners for this product test, you may think differently, based on how much you wish to spend, if you need to frequently inflate tyres and whether you want a compact tyre inflator to store inside a vehicle.

HOW WE TESTED THE CORDLESS TYRE INFLATORS

▶ **We began with finding some means of measuring the accuracy of each tyre inflator, so looked for a suitable tyre pressure gauge. In the November 2018 issue of *CM*, we tested several of them and the most accurate one at the time was a digital gauge from Sheffield-based Pneumatic Components Ltd (PCL). They still sell this gauge for £74.96, and we still have ours, so we had it checked and calibrated – at a reading of 30psi, the true reading was 0.04psi lower, so we were confident we had a very accurate benchmark. And the calibration/testing was conducted at 20°C ambient air temperature, so we also completed our own testing under the same conditions in Rob's garage.**

Starting with a tyre inflated to 25psi and checked with the PCL gauge, we then took a measurement with one of the cordless tyre inflators to determine its accuracy (see our data table for the results). In some cases, a little air was lost, especially if the end of the hose had a screw thread. We then inflated the tyre by 5psi which, in many cases, was to 30psi, and disconnected the tyre inflator. We also timed how long it took to inflate the tyre by 5psi. Finally, we took a reading with the PCL gauge to again check the accuracy of the tyre inflator. We used psi as a measurement of pressure throughout the testing, but all the tyre inflators could display bar, most of them included kpa and three of them could work with kg/cm^3.

Whilst the accuracy and speed of inflation helped to determine the winners and losers, there are many other factors to consider, such as size and portability, cost, ease of recharging the battery (including whether a universal USB-C lead is used or a dedicated one), additional features and the availability of spare parts, such as a replacement hose.

Model	Connector & hose length	V and Ah	Battery status?	Readings (psi, bar, kpa)	Actual reading at 25 & 30psi	Time 25-30psi (secs)	Max psi	Recharge	Score out of 20
Ring cordless digital tyre inflator and air pump	Screw thread 69cm	11.1V 4Ah	Yes	All 3	25/31.3	47	100	Mains dedicated lead, 12V CA	**17**
Sealey compact rechargeable tyre inflator	Screw thread 14cm	11.1V 2Ah	No	All 3 + kg/cm^3	25/29.6	86	120	Micro-USB (incl)	**17**
Draper jump starter & tyre inflator	Quick release 45cm	12V 12Ah	Yes	All 3	25/29.9	35	150	USB-C	**17**
Ring cordless rechargeable tyre inflator	Screw thread 65cm	7.4V 5Ah	Yes	All 3	24.8/30.4	69	120	USB-C & 12V car adapter (both incl)	**17**
Draper 12V cordless air compressor	Screw thread 15cm	12V 1.5Ah	No	All 3	25/30.6	77	150	Mains dedicated lead	**16**
Draper 20V air inflator	Screw thread 15cm	20V 3Ah	Yes	All 3 + kg/cm^3	24/28	40	110	Mains D20 charger	**15**
Clarke 12V cordless digital tyre inflator	Screw thread 25cm	12V 2Ah	Yes	All 3 + kg/cm^3	25.3/30	115	150	Mains dedicated lead	**14**
Sealey SV20 series cordless tyre inflator	Quick release 50cm	20V 2-6Ah	Yes	Bar/psi	21/26	34	100	Charger for SV20 range	**14**
Sealey 12V jump starter and tyre inflator	Quick release 45cm	12V 12Ah	Yes	All 3	23/31.2	67	120	USB-C (incl)	**14**
Ring cordless handheld rechargeable tyre inflator	Screw thread 14.5cm	3.7V 5.2Ah	Yes	All 3	25/30.8	132	120	USB-C (incl)	**13**

RING CORDLESS DIGITAL TYRE INFLATOR & AIR PUMP

PRICE £79.99
PART NUMBER RTC6000
FROM Ring Automotive
TEL 0113 213 7333
WEB https://shop.ringautomotive.com
WARRANTY 1 year
WEIGHT 1500g
CONNECTOR TYPE Screw thread
HOSE LENGTH 69cm
CHARGING Dedicated mains lead
EXTRA FEATURES LED, airbed attachments, powerbank, soft bag
SPARES Contact Ring Automotive

SCORE 17 OUT OF 20

CAR MECHANICS BEST BUY 2025

▶ Originally released in 2017, we tested the first generation of this model for six years and found its lithium-ion battery survived for that time. This newer version is noticeably quieter, but just as efficient at inflating a tyre using power from its built-in 11.1V 4Ah lithium-ion battery. There's a simple dial to turn to set a desired pressure and a large stop-start button to press to run the on-board compressor. The auto-inflate function works well, and we liked the LCD readout, which displays the target pressure, current pressure and a series of bars when it's close to finishing.

Whilst all the tyre inflators on test have adaptors to fill up a football, this one also has an assortment of attachments for blowing up an airbed. Sadly, a cheap airbed pump that plugs into a vehicle's 12V socket is much better.

Weighing in at 1.5kg, this is one of the heaviest and largest inflators on test, but also one of the fastest. You can't have it all and we reckon this is best suited to being stored in a garage. If you want something that offers better portability, Draper's new jump starter and tyre inflator for a little more money is worth considering.

SEALEY COMPACT RECHARGEABLE TYRE INFLATOR

CAR MECHANICS RECOMMENDED PRODUCT 2025

PRICE £54.99
PART NUMBER CTI120
FROM Sealey
TEL 01284 757500
WEB www.sealey.co.uk
WARRANTY 1 year
WEIGHT 450g
CONNECTOR TYPE Screw thread
HOSE LENGTH 14cm
CHARGING Micro-USB
EXTRA FEATURES LED, SOS, powerbank
SPARES Hose (£3.35) and various adaptors

SCORE 17 OUT OF 20

▶ A compact-looking and moderately lightweight cordless tyre inflator, which includes a powerbank (USB socket) for recharging equipment such as a mobile phone. With an inbuilt 11.1V 2Ah lithium-ion battery, we found this inflator was quite powerful for adding air to a tyre, although its test results pitched it below the lesser-powered but similarly priced inflator from Ring (RTC4000), beating it on weight by 300g. We found the pressure readings were very accurate, the hose is one of the shortest of all equipment on test (and can be bought separately should you lose or damage it), there's a useful light and the auto-inflate function is simple to use. Aside from a small pinhole-sized light to indicate the state of charge of the battery (green for OK, yellow for low, red for flat), there's no other means of knowing whether this inflator's battery needs a recharge.

It may not be the fastest tyre inflator, taking 86 seconds to add 5psi, but it is compact and easy to use. As something that can be stored inside a glovebox or door pocket of a vehicle, this cordless tyre inflator from Sealey is a worthy contender.

⇨

DRAPER JUMP STARTER & TYRE INFLATOR

PRICE £107.99
PART NUMBER 23722
FROM Draper Tools
TEL 023 8049 4333
WEB www.drapertools.com
WARRANTY 1 year
WEIGHT 1100g
CONNECTOR TYPE Quick release
HOSE LENGTH 45cm
CHARGING USB-C
EXTRA FEATURES Jump starter, LED & SOS, powerbank, storage case
SPARES Contact Draper

CAR MECHANICS **RECOMMENDED PRODUCT 2025**

▶ Draper Tools recently launched this jump starter and tyre inflator (towards the end of 2024). It's comparable to the similar-looking device from Sealey. This one has a large digital display and six buttons that are straightforward to understand. It's worthwhile reading the user manual because it wisely advises to recharge the unit before using it for the first time and to recharge it every three months.

The user manual also states the pressure readings are to 1.5psi accuracy, so we were impressed to see that our tests revealed a much greater level of accuracy (see our data table), although it would have been beneficial to have psi displayed to one or two decimal places instead of whole numbers. And we would have liked to have seen the pressure reading displayed when connecting the quick-release hose to a tyre valve. Instead, it's only revealed after setting a target pressure and pressing the button/switch to auto inflate.

We did like the three modes of inflation – car, motorbike, cycle and football – each with a pre-set target value, which unfortunately, isn't stored. And the unit of value displayed always resets to kpa after the inflator has automatically switched itself off.

The inflation time from 25psi to 30psi was the second fastest on test at 35 seconds, and it recorded a slightly faster time from 30psi to 35psi (33 seconds).

As a compact tyre inflator that stores neatly inside a hard carrycase, and with the advantage of having enough battery power to help start an engine or act as a powerbank, this new device from Draper packs quite a punch.

SCORE 17 OUT OF 20

RING CORDLESS RECHARGEABLE TYRE INFLATOR

PRICE £59.99
PART NUMBER RTC4000
FROM Ring Automotive
TEL 0113 213 7333
WEB https://shop.ringautomotive.com
WARRANTY 1 year
WEIGHT 750g
CONNECTOR TYPE Screw thread
HOSE LENGTH 65cm
CHARGING USB-C or 12V car adapter
EXTRA FEATURES LED, carrycase/bag
SPARES Contact Ring Automotive

CAR MECHANICS **BEST BUDGET BUY 2025**

SCORE 17 OUT OF 20

RING
30.0
psi
CORDLESS | RTC4000
+
−

▶ With one of the longest hoses on test (beaten by 4cm by another Ring inflator), this compact tyre inflator from Ring Automotive is straightforward to operate, has four memory functions for pre-setting pressures and is moderately quick to inflate a tyre using its built-in 7.4V 5Ah lithium-ion rechargeable battery.

For a small and relatively light piece of equipment, it's perfect for leaving inside a glovebox or door pocket to use when needed. The auto inflate works well and our only gripe concerns the hose, which is stored in a recess on the back of the body. It's a good idea but requires a little practice to ensure both ends of it fit into their particular cut-outs – the hose may need to be stretched.

It may seem strange to have awarded this the Best Budget Buy when it costs almost sixty quid, but we feel that paying up to £60 for a rechargeable digital tyre inflator is at present, quite cheap. Note that some of the inflators in this price bracket are for a body only, so unless you already have the battery and charger, they won't be a budget buy.

DRAPER 12V CORDLESS AIR COMPRESSOR

PRICE £52 **PART NUMBER** 24239 **FROM** Draper Tools

TEL 023 8049 4333 **WEB** www.drapertools.com **WARRANTY** 1 year

WEIGHT 825g **CONNECTOR TYPE** Screw thread

HOSE LENGTH 15cm **CHARGING** Dedicated mains lead

EXTRA FEATURES LED, SOS, 12V car adapter, cloth storage bag

SPARES Hose (part number 18406) £2.40

SCORE 16 OUT OF 20

CAR MECHANICS RECOMMENDED PRODUCT 2025

▶ Released in 2024, this is a replacement for an older model, which if you can find it, doesn't include all the features with this latest version.

This is a moderately compact tyre inflator (25x13x7cm with the hose removed) that fits inside a cloth storage bag, so it can be stored inside a vehicle. The 12V 1.5Ah lithium-ion rechargeable battery has a dedicated power lead, but if the battery is flat, there's an adaptor to plug into a vehicle's 12V cigarette lighter socket.

We liked the useful LED torch and the accuracy of the pressure readings (pretty much spot on). The time taken to inflate a tyre by 5psi was in the middle of our results table.

This was the only one of two inflators we tested that had no means of knowing the state of charge of the battery.

The controls for pre-setting a pressure are straightforward (simple buttons labelled + and -), after which a pull of the trigger activates the inflator's compressor and it can be left to feed air into a tyre, switching off automatically when the set pressure is reached. It's essential to then press the trigger again to switch off the auto-inflate setting, otherwise upon unscrewing the end of the hose, the inflator's compressor will start running again. In such an event, pulling the trigger switches it off, but we were puzzled by this at first.

With a short hose, it's hard to leave the inflator attached to a tyre valve unless it's close to the ground. We liked the way the hose attaches to the body of the inflator with a plastic locking ring.

As a moderately compact tyre inflator that's supplied with its own bag, this is useful for storing inside a glovebox or door pocket.

DRAPER 20V AIR INFLATOR

SCORE 15 OUT OF 20

PRICE £35.80 (bare body only)

PART NUMBER 55767 **FROM** Draper Tools

TEL 023 8049 4333 **WEB** www.drapertools.com

WARRANTY 3 years (register online with Draper)

WEIGHT 1350g **CONNECTOR TYPE** Screw thread

HOSE LENGTH 15cm

CHARGING Mains-powered Draper D20 battery charger

EXTRA FEATURES N/A

SPARES D20 12V 3Ah Li-ion battery (00649) £36; 20V Li-ion charger (97914) £15; hose (97367) £5.76

▶ Part of Draper's 20V range of power tools, this 20V air inflator can be a cheap purchase if you already have the battery and charger for their other D20-branded equipment. And there's an impressive assortment of spare parts available for this tool.

With a fully-charged 20V 3Ah lithium-ion battery attached, this performed well in our tests, inflating a tyre from 25 to 30psi in 40 seconds (the third fastest time), proving that a powerful battery is essential. Unfortunately, it wasn't accurate on the pressure readings, measuring 1psi less at 25psi and 2psi less when our calibrated PCL pressure gauge displayed 30psi (despite psi is displayed to one decimal place, target pressures are only set as whole numbers). And we found the symbols on the three small buttons for switching on the inflator and increasing or decreasing a desired pressure reading were difficult to read because they are so small.

The way the hose attaches to the body makes it quite awkward to fit. Despite the end is threaded, there's a plastic locking ring that fits over it, but it can only sit on the end of the hose. Consequently, you must push or turn the hose into the body whilst tightening the locking ring. Get it wrong and the hose will either leak or fall out.

Despite these issues, we liked the auto-inflate function, allowing a specific pressure to be set and after one press of the trigger, the power tool inflated the tyre and switched itself off. And unlike Draper's 12V tyre inflator that we tested, there was no confusion over having to press the trigger again to switch off the auto-inflate setting.

If you have several D20 power tools from Draper, then this tyre inflator is definitely worth considering, providing you compensate for the inaccurate pressure readings.

CLARKE 12V CORDLESS DIGITAL TYRE INFLATOR

SCORE 14 OUT OF 20

PRICE £59.98 **PART NUMBER** 000111301

FROM Machine Mart **TEL** 0115 956 5555

WEB www.machinemart.co.uk **WARRANTY** 1 year

WEIGHT 980g **CONNECTOR TYPE** Screw thread

HOSE LENGTH 25cm **CHARGING** Dedicated mains power lead

EXTRA FEATURES LED light when inflating, powerbank, 12V car adaptor

SPARES N/A

▶ A large-looking, but lightweight power tool that's supplied with a removable 12V 2Ah lithium-ion battery that doubles up as a powerbank. And if the battery goes flat, there's a similar-looking unit to attach, which can be connected to a vehicle's 12V cigarette lighter socket to carry on inflating tyres.

The controls for switching on, changing pressure readings and setting them are straightforward to use but awkward to press, and it can get a little confusing as to what the pressure reading of a tyre is until you learn to wait for a few seconds for it to be displayed.

At first, we found the auto-inflate function didn't work, but then we noticed in large red text throughout the user manual that it only works with pressures set above 30psi. So, whilst we tested this equipment in the same manner as the other products, we also tried setting a pressure at 40psi and found the auto-inflate function worked and switched off the compressor afterwards. This is the only inflator where the trigger must be manually locked to leave the compressor running, although it still automatically switches off once the set pressure is reached.

Despite being equipped with a 12V 2Ah battery, we found the inflator was quite slow when tested (nearly two minutes to inflate a tyre by 5psi). However, the pressure reading is reassuringly displayed with one decimal place (when set to psi) and increases in increments of tenths (eg. 32.1, then 32.2), so you feel as though progress is being made. Plus, we liked the fact the inflator went a little beyond the target pressure (up to 40.5psi after setting it to 40psi) to allow for the pressure to settle and to possibly compensate for air loss when releasing the hose – the thread on the end of the hose is quite long, so we found we lost a lot more air when attaching and unscrewing it when compared to other screw thread hoses.

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SEALEY SV20 SERIES CORDLESS TYRE INFLATOR

SCORE 14 OUT OF 20

PRICE £34.10 (body only) **PART NUMBER** CP20VAP **FROM** Sealey

TEL 01284 757500 **WEB** www.sealey.co.uk **WARRANTY** 1 year

WEIGHT 1500g **CONNECTOR TYPE** Quick release

HOSE LENGTH 50cm **CHARGING** Dedicated battery charger

EXTRA FEATURES N/A

SPARES SV20 battery (from £40), battery charger (from £20), hose (£8.75) and most parts

▶ If you have already invested in Sealey's SV20 range of power tools (so you already have at least one battery and a charger), then this cordless tyre inflator is just as cheap as some of the less-powerful equipment we've tested. If not, then it's potentially one of the most expensive. Weighing in at 1.5kg (including battery and hose), it's one of the heaviest on test. Typical of a power tool, a wide range of spares are readily available, from the battery and hose to the gearbox and display panel, which is impressive.

We liked the long 50cm hose with its quick-release car tyre valve adaptor, which is much easier to use than a screw thread type. We also liked the means of switching on the inflator by squeezing the trigger (as well as pressing the on/off button on the back of the body) and the battery status lights on the side of the battery. At times however, we found the controls and display were confusing, requiring several presses of the buttons to set a target pressure. Plus, the trigger has to be permanently squeezed to inflate a tyre, although the pump switches off automatically when the pressure is reached. Surprisingly, our testing revealed the accuracy of the pressure readings was the worst of all the inflators on test. We started with a tyre at 25psi (measured using our calibrated gauge) and found this inflator displayed a reading of 21psi. We then inflated the tyre by 5psi, so the reading was now 26psi, but our calibrated gauge measured 30psi. A second test on another day started with the same tyre at 30psi, but this inflator measured 25psi instead.

It's recommended by most manufacturers of tyre inflators that a separate gauge should be used to double-check a pressure reading, so providing you do this, then Sealey's inflator is the fastest in our group test (at pumping air into a tyre), but what you gain in pumping air into your tyres, you may lose in time spent checking the pressures with another gauge.

SEALEY 12V JUMP STARTER & TYRE INFLATOR

SCORE 14 OUT OF 20

PRICE £109.90 **PART NUMBER** RS1200TI

FROM Sealey **TEL** 01284 757500

WEB www.sealey.co.uk **WARRANTY** 1 year

WEIGHT 950g **CONNECTOR TYPE** Quick release

HOSE LENGTH 45cm **CHARGING** USB-C

EXTRA FEATURES LED, SOS, powerbank USB socket, 12V vehicle jump starter

SPARES Hose (part number RS1200TI-03) for £7.79

▶ A promising-looking piece of equipment that's compact (25.5cm long, 10cm wide and 5cm deep), but capable of starting an engine with a flat battery as well as inflating its tyres. A good-quality hose is included, which has a quick-release end for attaching to a tyre valve. Selecting the tyre pressure function (there's a button for it), choosing the type of pressure to display (kpa, bar and psi – the default pressure is always 36psi), setting a desired pressure and activating the inflator is best worked out by trial and error. There's no pressure reading displayed until a tyre is being inflated and that pressure reading is only in whole numbers for psi and kpa, but to one decimal point for bar.

We found the accuracy of those readings to be not as good as the other equipment on test. After inflating a tyre to 25psi and checking it with our calibrated gauge, Sealey's tyre inflator displayed 23psi when we began inflating it. When it finished at 30psi, we checked the tyre's pressure with our gauge and found it was a little more at 31.2psi. A second test starting at 30psi and inflating the same tyre to 36psi displayed a reading of 28psi when the inflator started working. When it finished at 36psi, our gauge read 37.5psi.

So, there's a 4-8% inaccuracy for this inflator's pressure readings (when using psi). If you can live with this, along with the fact that you can't measure a tyre's pressure without attempting to inflate it, then this all-in-one jump-starter, inflator, torch and powerbank is a useful piece of equipment to carry on board a vehicle.

RING CORDLESS HANDHELD RECHARGEABLE TYRE INFLATOR

SCORE 13 OUT OF 20

PRICE £32.99

PART NUMBER: RTC2000

FROM: Ring Automotive

TEL: 0113 213 7333

WEB: https://shop.ringautomotive.com

WARRANTY: 1 year **WEIGHT** 500g

CONNECTOR TYPE Screw thread

HOSE LENGTH 14.5cm **CHARGING** USB-C (cable included)

EXTRA FEATURES LED, powerbank USB socket, bike bottle-style storage cage, soft bag

SPARES Contact Ring Automotive

▶ One of the most compact tyre inflators on test and judging by its bike bottle-style storage cage, it's not solely intended for vehicles. This is also reflected in the time it took to add 5psi of air pressure to a vehicle tyre – 132 seconds, making it the slowest on test. However, considering there's only a 3.7V 5.2Ah lithium-ion rechargeable battery concealed inside, that's hardly surprising.

As a small unit that can be tucked inside a glovebox or door pocket, providing it's only used for minor adjustments to tyre pressures (and not to inflate a flat tyre), this is a versatile piece of equipment that can also be used as a torch and a powerbank to recharge a mobile phone. And the accuracy of the pressure readings was impressive, along with memory functions to store up to four pre-set pressures.

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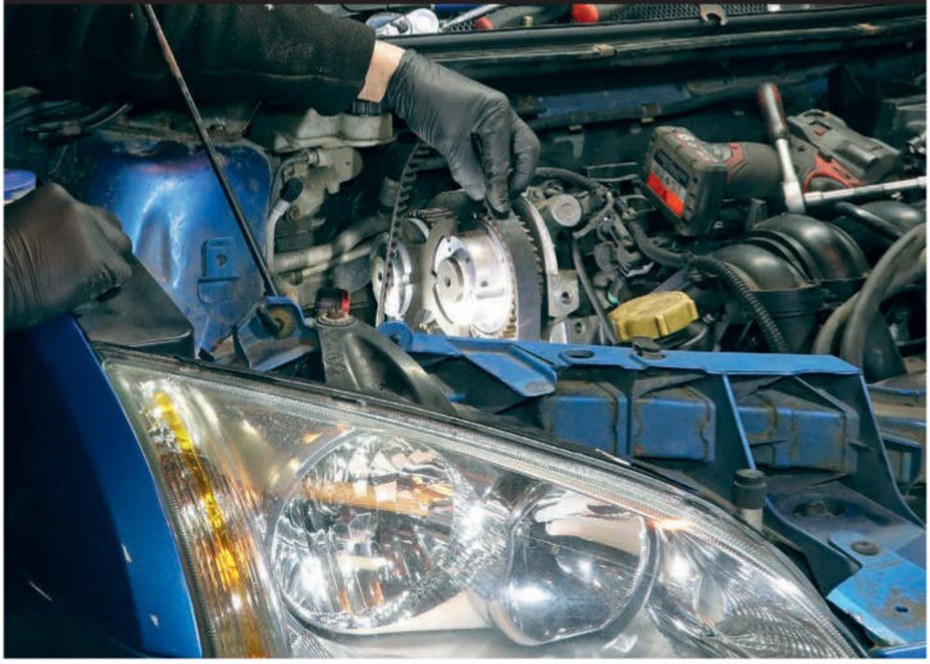
Timing Belt Clinic

2006 FORD FOCUS 1.6 Ti-VCT



Rob Hawkins visits AES York Ltd to follow them replacing the timing belt and water pump on *CM*'s Ford Focus Mk2.

TIMING BELT CHANGE INTERVAL

Every 100,000 miles or 8 years.

TOOLS REQUIRED

- ▶ Impact driver
- ▶ Large container for coolant
- ▶ Pry bars
- ▶ Screwdrivers
- ▶ Sockets/spanners: 8-18mm
- ▶ Torque wrench
- ▶ Torx bits: E8, E10, T30
- ▶ Trolley jack and block of wood

TORQUE SETTINGS

Tensioner mounting bolt (centre bolt):	**25Nm**
Water pump pulley bolts (four):	**27Nm**
Water pump mounting bolts:	**10Nm**
Crankshaft locking pin cover bolt (side of engine block):	**20Nm**
Crankshaft pulley bolt:	**40Nm + 90° (M12)**; **100Nm + 90°** then wait 10 seconds and tighten **15°** (**M14**)
Alloy road wheels:	**130Nm** (without conical washers) **110Nm** (with conical washers)

The timing belt and two auxiliary drive belts on the Ford Focus Mk2 1.6 Ti-VCT petrol engine should be replaced at every 100,000 miles or eight years. With *CM*'s 2006 Focus having 122k on the clock and no evidence of a belt change, we decided it was wise to get it done and to also replace the water pump, which is driven off one of the auxiliary belts.

This 1596cc twin-cam petrol engine has variable camshaft timing that's operated through adjustment of the cam pulleys. It's essential to lock those pulleys when replacing the timing belt and we used a suitable locking tool that's part of a comprehensive kit from Sealey. It is also important to lock the crankshaft, which entails removing a 10mm bolt from the side of the engine block (accessed via the OSF wheelarch) and fitting a special locking pin. If the crank isn't locked, there's no woodruff key on the end of it (it's a floating crank), so if it moves, there are no markings to help – finding top dead centre (TDC) for piston number one is the only hope.

Whilst the correct timing tools will save the day for replacing the timing belt on this engine, the same can't be said for fitting the two auxiliary drive belts. These are known as stretch belts, so there are no tensioners and AES has the tools to help wind new belts on, but often finds it's easier to use an assortment of pry bars and screwdrivers. They also left the belts in direct sunlight for a few hours to help warm them up and make them more stretchable.

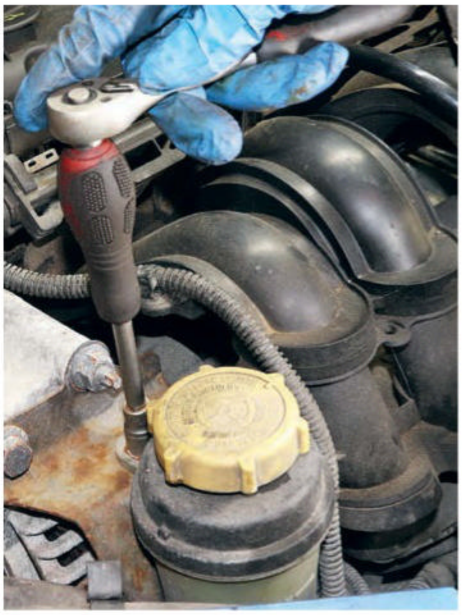
One problem we didn't expect to halt progress in a major way concerned the thermostat for the engine coolant and, in particular, its housing. Although this isn't directly related to the timing belt, in our case, we suspected there was a problem with the thermostat because the temperature gauge never crept up to the normal reading. So, we decided to renew it.

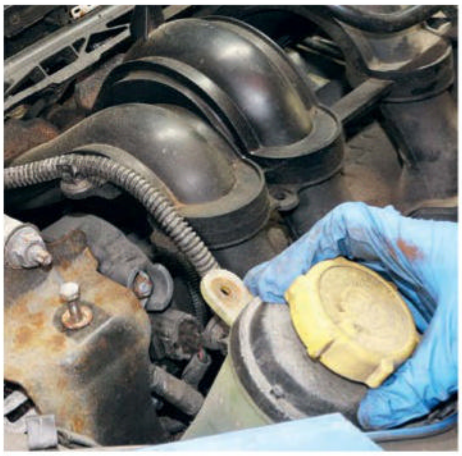
The thermostat is attached to the engine block and can be accessed at the front of the engine bay (offside area). It's partly concealed by the alternator and its mount, which must be removed to change the timing belt. After undoing four 8mm bolts and removing the thermostat housing, we extracted the old thermostat in bits. The end of it had broken off.

Looking at a new thermostat housing with the thermostat installed, we could see what had happened to the old one. The end of the thermostat is held in place by two plastic lugs that are part of the housing. These plastic lugs had broken off the old housing, resulting in the spring on the end of the thermostat being loose (and the metal piece that holds the spring in position and slots into the plastic lugs for the housing also being loose).

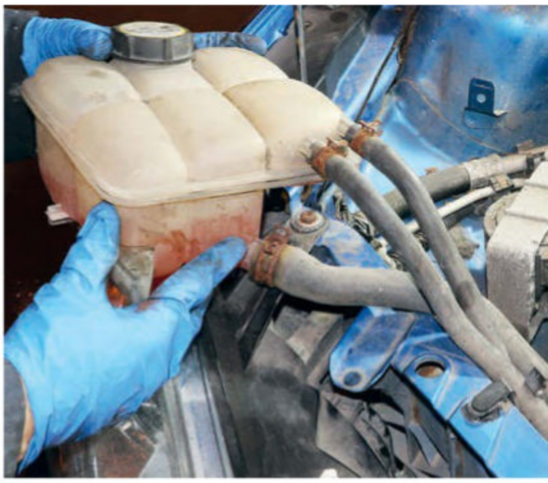
Feeling confident that fitting the new thermostat housing would solve the engine cooling issue, we were soon left scratching our heads as to why it wouldn't fit onto the engine. It soon became clear that the end of the thermostat that feeds into the engine was the problem. Those plastic locating lugs were too far apart, but needed to slot into a hole in the engine. We couldn't squeeze them together or file them down because that would weaken them – and this is probably what happened to the lugs on the old thermostat housing.

We had acquired an aftermarket thermostat housing, so ordered a different brand, only to find the same problem arose. Our next option was to spend £180 on a genuine Ford housing, which fitted.





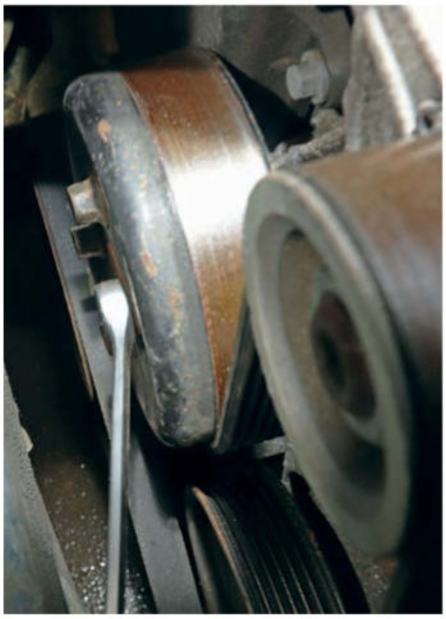
1 Looking at the engine bay of the Focus, we soon realised there were a few components obstructing access to the timing belt area of the engine. The first to be moved aside was this power steering fluid reservoir, secured with a 10mm bolt. It couldn't be moved too far.



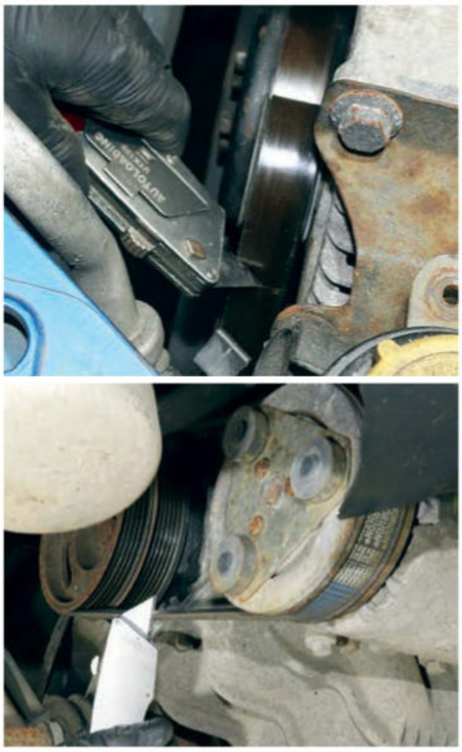
2 The coolant expansion tank also needed to be moved out of the way, across to the centre front of the engine bay. It sits in a couple of plastic locating lugs, so needed to be carefully lifted out of them.

3 ◀ To be safe, we detached the positive terminal at the battery and fitted a piece of cardboard to reduce the risk of it accidentally being reattached. We wanted to avoid all risk of the engine being turned once the timing tools were fitted.

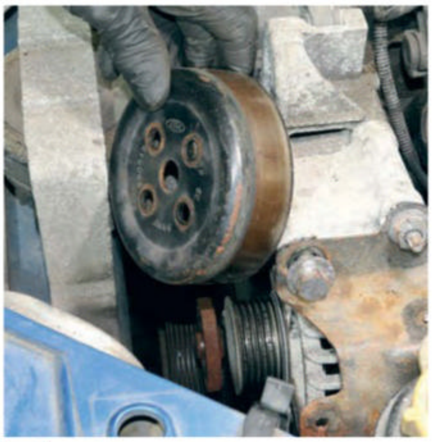
4 ▶ The offside front wheelarch liner needs to be removed to help access the front of the engine to renew the timing belt. The liner is secured with several Torx T30 and crosshead screws, many of which were corroded on our vehicle.



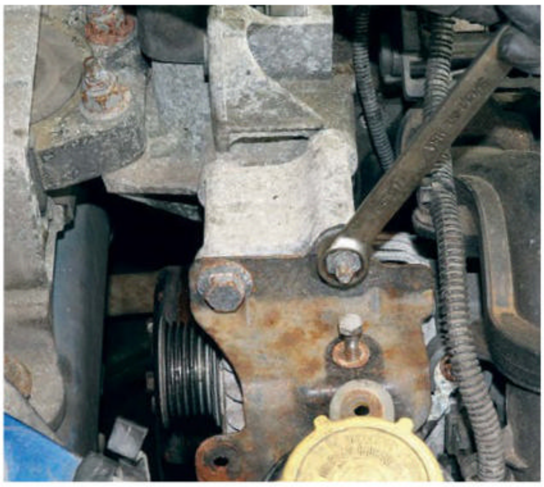
5 The four 10mm bolts holding the water pump pulley to the water pump were slackened, which was much easier to do with the auxiliary drive belt gripping the pulley, despite they should be tightened to a mere 27Nm.



6 ◀ Mechanic Pete at AES explained that he rarely cuts through old auxiliary drive belts, but with no tensioners, the two stretch belts are difficult to wind off and we were renewing both of them.

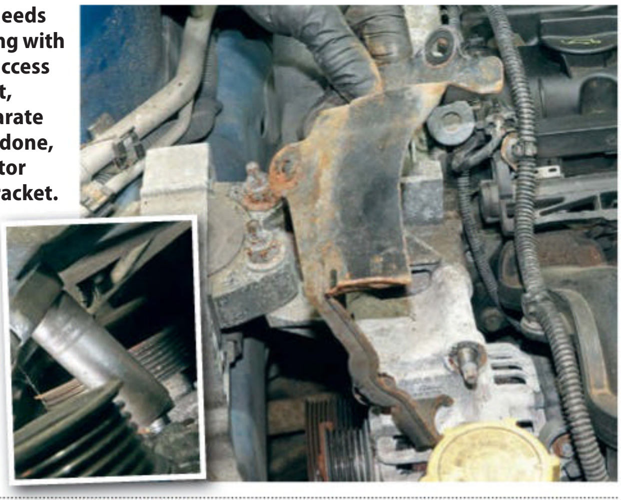


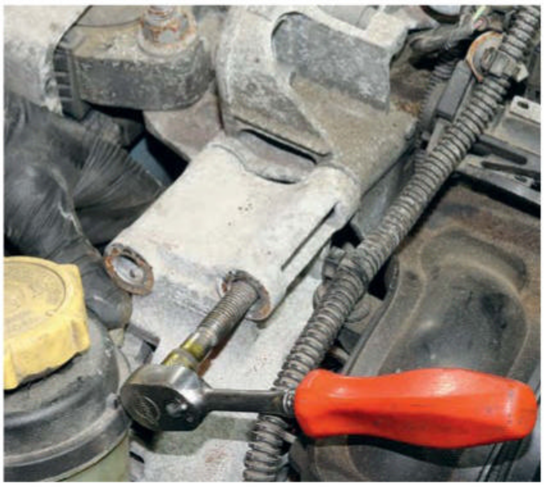
7 With the auxiliary drive belts discarded, the water pump pulley could now be removed after extracting its four 10mm mounting bolts. A little wiggling of the pulley soon released it, and it was placed aside with its four bolts.



8 ◀ The alternator needs to be removed, along with its mount, to be able to access the timing belt area. First, the 15mm nut and a separate bolt shown here were undone, which secure the alternator and a metal mounting bracket.

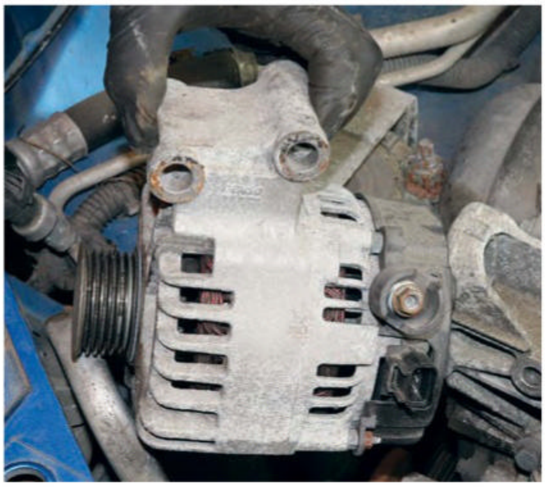
9 ▶ Looking down the face of the upper timing belt cover, we could see a 15mm bolt holding the metal mounting bracket, so it was undone. We could now remove the bracket shown here.

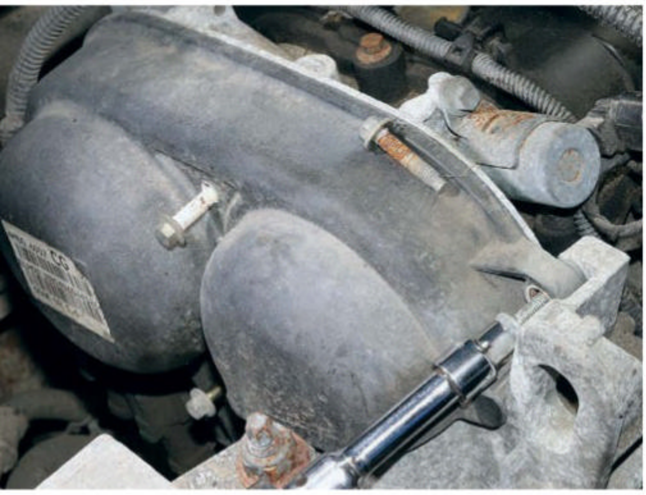




10 ◀ The alternator was now loose but couldn't be removed yet. The stud that was used to secure the 15mm nut (mentioned in Step 8) had to be extracted. Luckily, it could be unwound using an E8 socket.

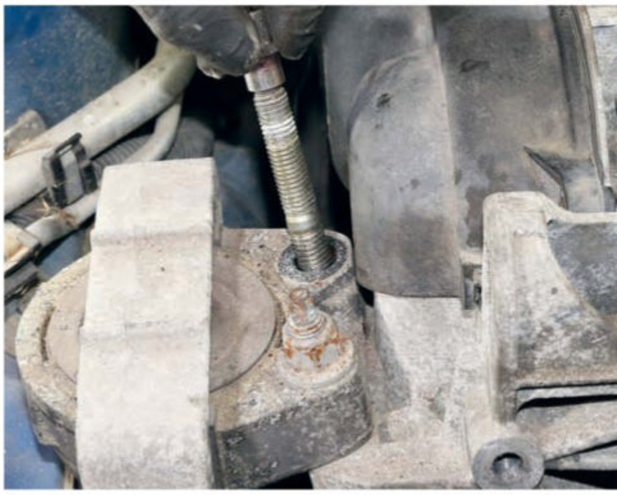
11 ▶ Finally, the alternator could be removed, although a live wire (not live any more because we'd disconnected the battery) had to be detached by undoing a 10mm nut, and there was also an electrical plug to remove.

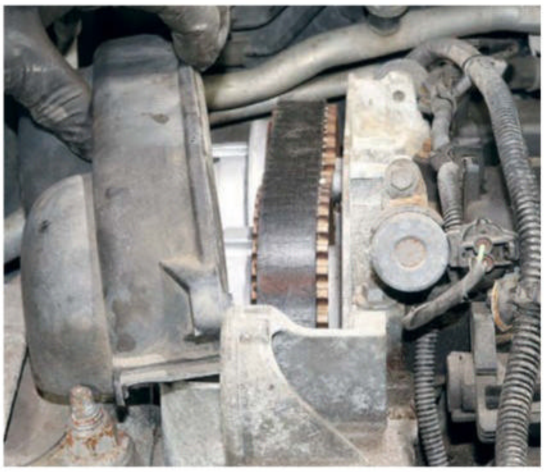




12 ◀ The upper timing belt cover needed to be removed to enable us to fit the locking tool for the camshaft pulleys, so we looked for the nine 8mm bolts that secure it and undid them all. The upper centre bolt shown here was the longest, the other eight were the same length.

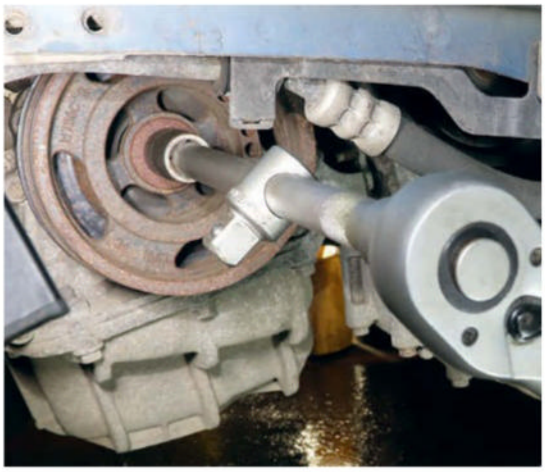
13 ▶ The upper timing belt cover was loose, but the engine mount was obstructing its extraction. We hoped that by removing the stud shown here, there would be enough space to remove the cover. After undoing an 18mm nut, we used an E10 socket to unwind the stud.

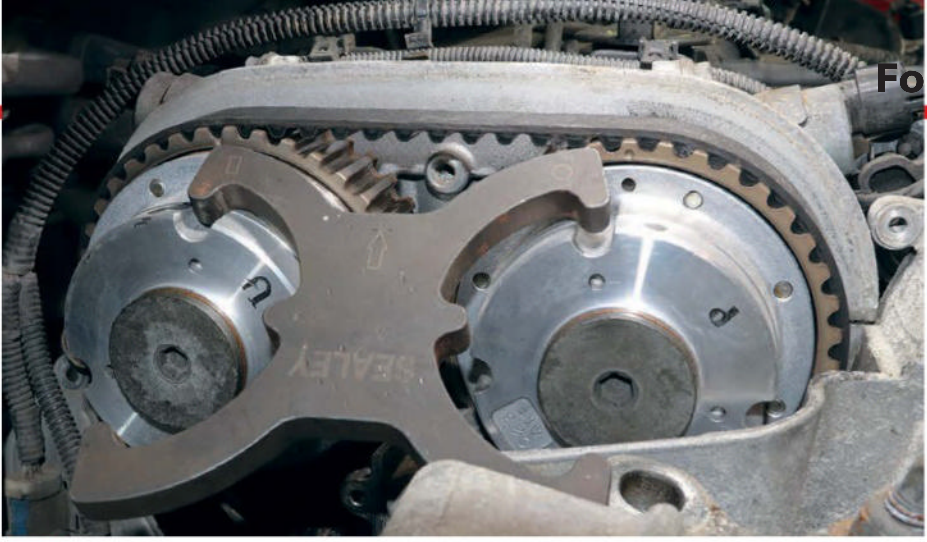




14 ◀ Now there was enough space to wiggle the upper timing belt cover out through the top of the engine bay. We could now see the timing belt and also the twin camshaft pulleys.

15 ▶ We needed to time up the engine, but with no markings on the crankshaft pulley, we had to rely on the markings on the camshaft pulleys. So, using an 18mm socket, extension bars and ½in ratchet, the crankshaft was turned clockwise until…



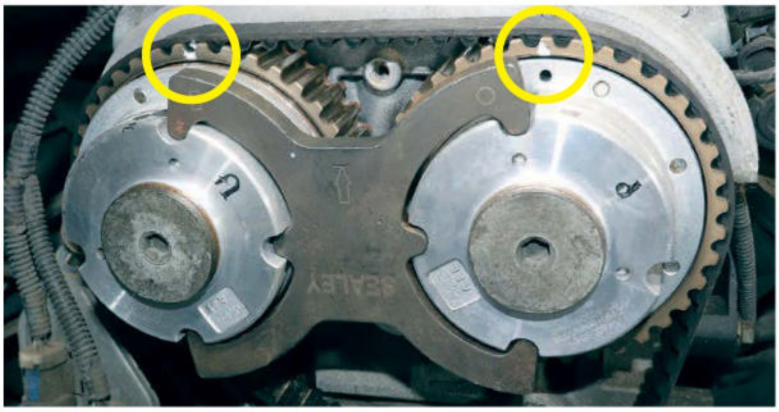


16 …a dot on the face of the inlet cam pulley and an oblong shape on the exhaust cam pulley were at 12 o'clock. This enabled a substantial locking tool to be fitted to hold both cam pulleys in position, although not yet because the engine mount was in the way.

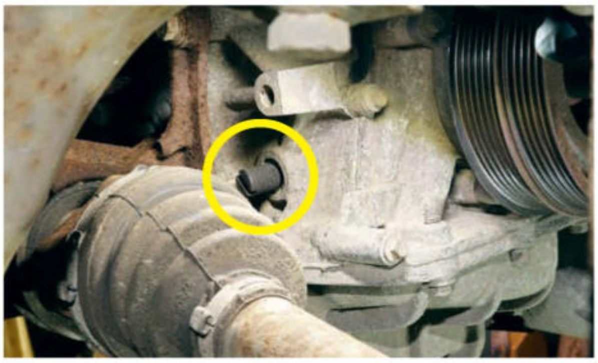
17 Before the engine mount could be removed, the engine needed to be supported, so a trolley jack with a block of wood on top was positioned underneath the sump, then raised until it started to lift the engine.

18 ◀ The half of the engine mount attached to the inner wing was removed first. This is secured to the engine with a couple of 18mm nuts (one was undone in Step 13) and to the inner wing with two 15mm bolts.

19 ▶ The other half of the engine mount (which was also used to mount the alternator) could now be lifted free, after undoing three 13mm bolts. We could now fit the camshaft locking tool.



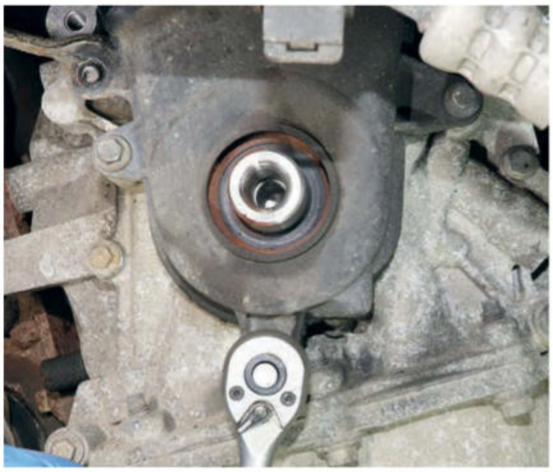
20 The camshaft locking tool was manoeuvred into position and it fitted without a fuss. Pete wisely recommended adding paint marks to the dot and oblong markings on the camshaft pulleys to help see them (circled).

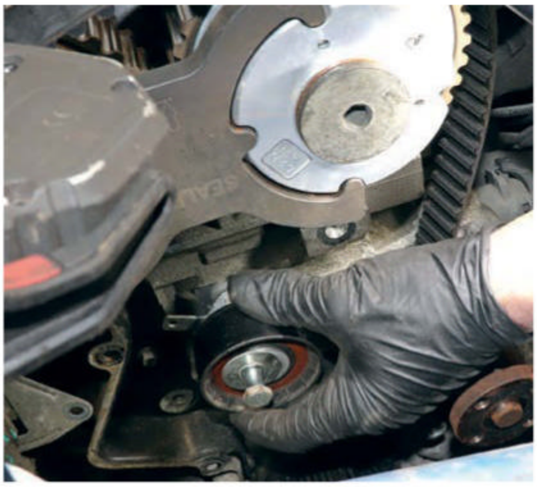


21 Whilst the cams were locked, the crankshaft also needed locking. Looking at the engine block close to the offside driveshaft, we spotted a 10mm bolt and extracted it. A longer locking pin was threaded in (circled) which locked the crank – we tried to rotate the crank and it couldn't move.

22 ◀ With the crank and cams locked, we were ready to remove the timing belt, but there were a few more components in the way, such as the crankshaft pulley. Using an impact driver, its 18mm centre bolt was undone and we wiggled the pulley off the end of the crankshaft.

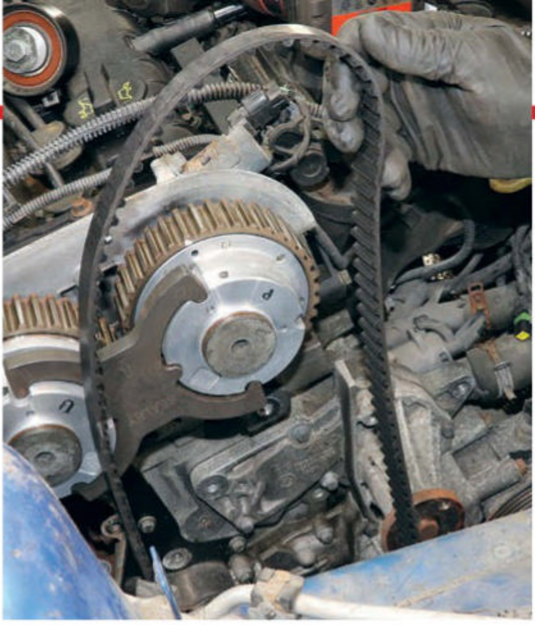
23 ▶ A small plastic cover concealed the bottom timing cog on the end of the crankshaft, but after undoing three 8mm bolts, it could be removed. We could now see all of the timing belt.

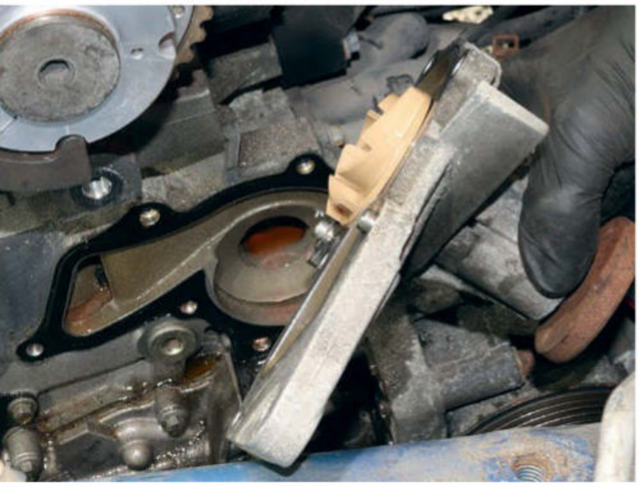




24 ◀ Confident the engine was correctly timed up and locked, the 13mm centre bolt for the timing belt tensioner was slackened, which also took the tension off the timing belt. We spotted that the tensioner's bolt is threaded into the water pump housing.

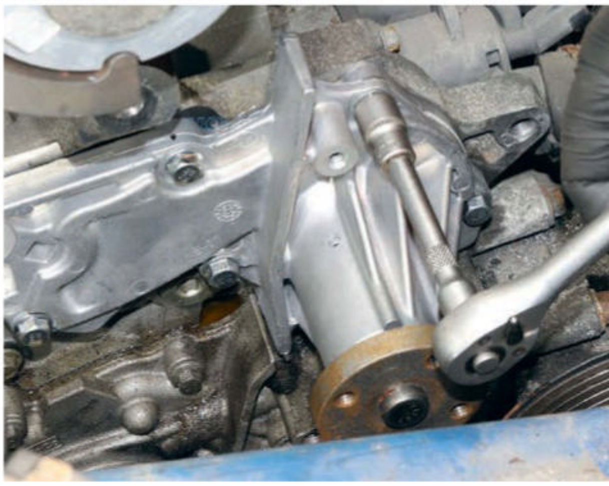
25 ▶ The old timing belt could now be taken off, sliding it off the tops of the camshaft pulleys and unhooking it from around the bottom timing cog on the end of the crankshaft.

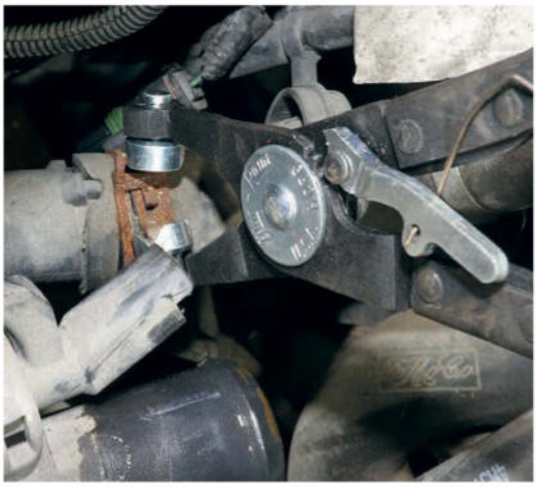




26 ◀ With a large container underneath the engine, six 8mm bolts were progressively undone for the water pump. Coolant started to dribble then pour out. Rob discovered the tray wasn't quite in the right place, obstructed by the trolley jack, so he looked for a mop.

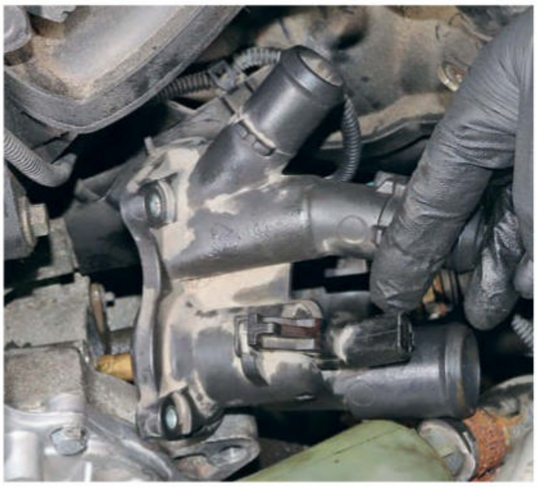
27 ▶ The new febi water pump came supplied with a new gasket and also a new set of larger 10mm-headed bolts (same M6 thread size). After fitting the new water pump and gasket, the bolts were progressively tightened.

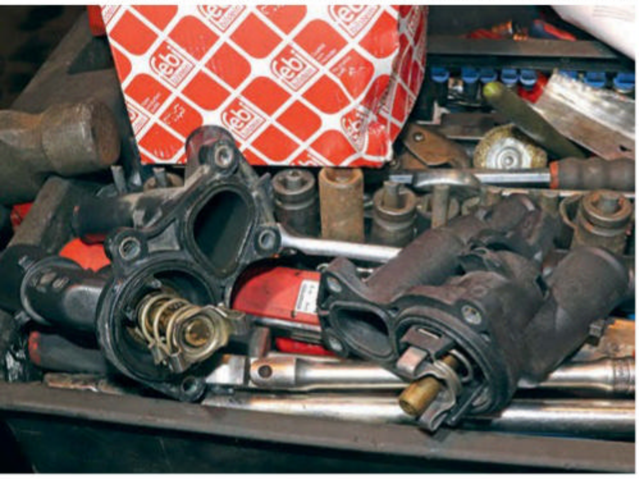




28 ◀ We were on a roll, but before we fitted the new timing belt we wanted to change the thermostat because the engine was running too cold. The thermostat housing is attached to the engine block close to where the alternator is fitted. First, we detached the two coolant hoses to it.

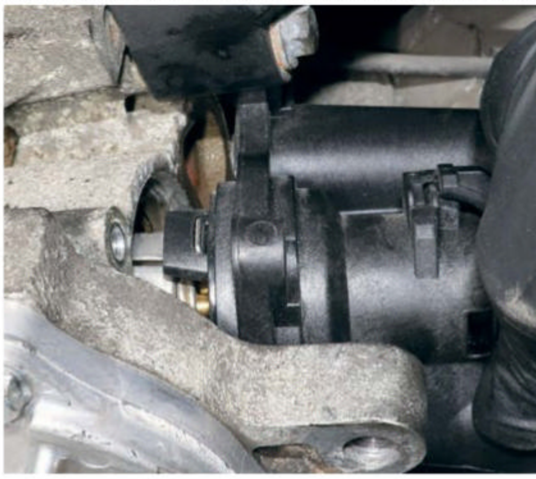
29 ▶ The thermostat housing is secured to the engine block with four 8mm bolts, two of which are very awkward to access. Eventually, they were all undone and we could remove the housing and thermostat.





30 ◀ Comparing old and new housings, we could see that the end of the thermostat (the spring and securing clip) wasn't held by two plastic locating lugs that form part of the old housing – the lugs had broken off.

31 ▶ And when we attempted to fit the replacement aftermarket housing, those plastic lugs were in the way. Perhaps this is why they had broken off on the old housing. We tried another aftermarket housing and it had the same problem, so ordered a genuine Ford housing and it fitted.



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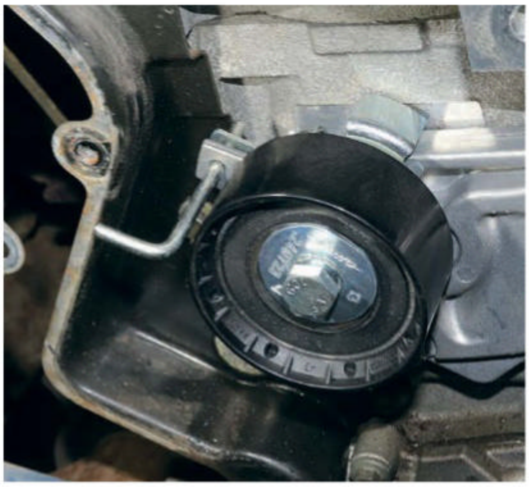
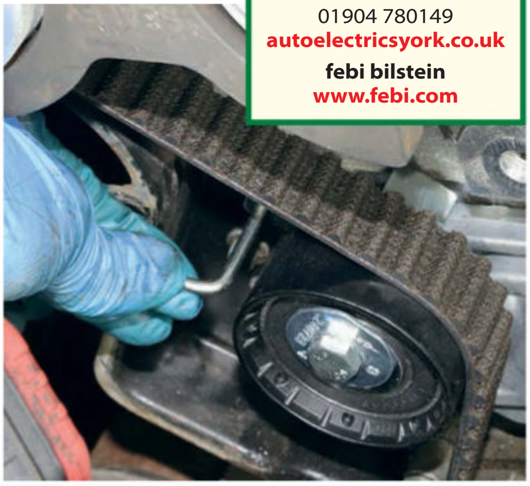
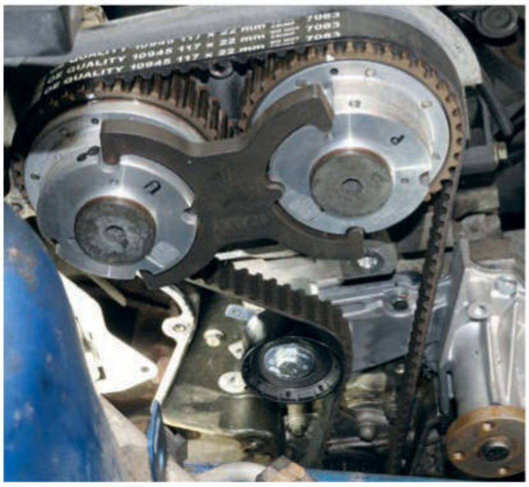


32 ◀ Resuming the fitting of the new timing belt assembly, the first component to address was the new tensioner. Supplied by febi as part of a kit (p/n 173068), it included a locking pin for its automatic tensioning mechanism. The tensioner was fitted with a new 13mm mounting bolt and tightened to 25Nm.

33 ▶ The new timing belt was checked to ensure it was the same as the old one, then it was fitted over the camshaft pulleys, crankshaft timing cog and around the tensioner. The locking pin was then extracted from the tensioner.



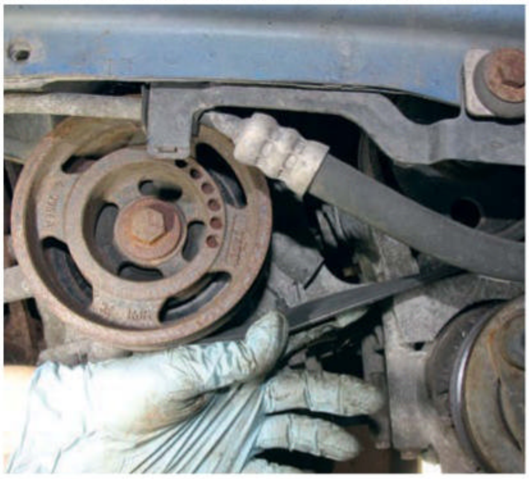


34 ◀ Once the locking pin had been removed from the tensioner, it automatically adjusted the tension on the timing belt. We removed the timing tools, completed two manual turns of the engine, then checked the tools could be refitted.

35 ▶ All that remained was to refit the parts that had been removed and to refill the cooling system. Rob refitted the water pump pulley, then tried to manoeuvre the timing belt cover into position, only to realise it was in the way.

36 ◀ A small amount of thread lock was applied to the water pump pulley's four securing bolts before fitting them. A screwdriver was placed across the fitted bolts to lock the pulley when tightening them to the recommended 27Nm.

37 ▶ The one job we were not looking forward to was the fitting of the auxiliary drive belts. Mark Shipman at AES recommended removing the offside front headlight to improve access to the front of the engine. It's only secured with a Torx T30 screw and requires the use of a flat-blade screwdriver to release a couple of plastic tags.



38 ◀ The larger drive belt was fitted first, manoeuvring it around the crankshaft pulley, water pump, alternator and power steering pump, but it was seemingly too short to fit around all of them. The belts were left in direct sunlight to warm up.

39 ▶ Armed with a pry bar and 18mm socket, Pete manually rotated the crankshaft pulley whilst winding the belt on using the pry bar. It was hard work and once the longer belt had been fitted, the second shorter one could also be wound on.

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NOVEMBER 8-10

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Astra Mk2 rally replica.

Mike Humble visits the 40th anniversary of the Classic Car Show at the NEC.

▶ The Lancaster Insurance Classic Car Show marked its 40th birthday since the first gig way back in 1984. Just who would have thought the event would steadily grow year-on-year to become what it is today – Europe's largest classic car gathering. Thankfully, the new owners of the NEC have finally put right the once awful sodium lighting that made even the best images taken come out like a freeze-frame of a 70's American soap opera. All new LED lighting has really brightened the place up and your images taken on the day now pop with clarity and colour. But it isn't just the show itself that has marked a birthday, several cars some of us love (and loathe) have proven that life begins at forty.

I looked around on the Saturday and met up with a few friends as well. Mooching around the show is just as much about catching up with folk as it is admiring the vehicles. Everything you could possibly imagine is there for your delectation, be it retro classics or exotica. Sierra's to Simca's or Fuego's to Ferrari Daytona's, everything and everyone is catered for at Birmingham's National Exhibition Centre. Sticking to the *Car Mechanics* theme of vehicles you can easily wield a spanner on your driveway, I mainly paid attention to the sort of cars you and I would have once held the car keys to at some point in our lives.

One of the first couple of chaps I got chatting to was Jeremy Howson from the 200 & 400 Owners Club and Chris Langford from the Rover 200/400 Owners Club. Two generations of 200 have recently celebrated a birthday – the original 1984 launched 213 and 1989 214/216 have reached 40 and 35 years old respectively. The 213 (which was joined by the 216 a year later) marked a serious uplift in terms of quality for Austin Rover. These cars were a gulf apart from the usual level of quality for a British car. Like the Triumph Acclaim, the 200 series was a collaboration with Honda and by the time the next-gen 200 was launched in 1989, Rover were now producing small family cars that matched and often bettered the competition. Jeremy had a 214 GSi that was actually the first production model off the line, looking resplendent after a five-year restoration. On another club stand was Chris Langford and his gorgeous looking 216 Vanden Plas EFi.

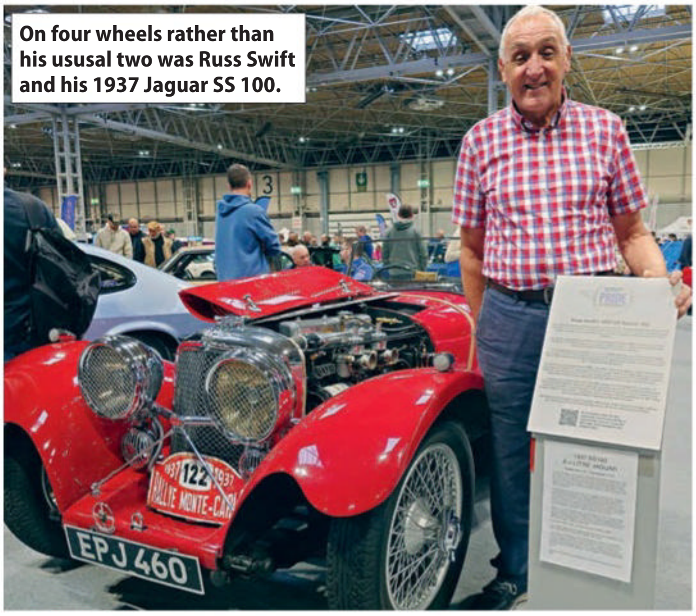
Precision and stunt driver Russ Swift happens to be an old pal of mine who's always good for a chinwag. He owns a small collection of classic cars and was proudly showing his recently acquired 1937 Jaguar SS100. Another chum is recently retired traffic Police Sargent Julian Pearson, an avid retro car collector. You may have seen him in the TV series *Traffic Cops* but at the time of the show, he had his near concourse condition Talbot Alpine on display. I was blown away at the condition of his car.

Over at the SAAB Owners Club, they were marking the 40th birthday of the 16v turbo APC engine. APC stood for automatic performance control, which in layman's terms is an electronic boost control and ignition timing system. It can alter the output of the engine taking into consideration of fuel type or quality, and altitude – automatically avoiding harmful damage done by pinking or pre-detonation in the cylinders. Paul Davies was there with his lovely 1985 900 T16S hatch.

Other highlights in the birthday club included the Austin Montego and Astra Mk2 – both also commemorating forty years since their introduction. For those who have never attended the Lancaster Insurance Classic Car Show, you really ought to. It isn't cheap to get in but it's by far the biggest car show in this country and for what you can see, buy, watch or get involved with represents good value for money.

The show is so big you really need two days to see it all…

ce Classic Car Show


On four wheels rather than his ususal two was Russ Swift and his 1937 Jaguar SS 100.

Up where he belongs – Jeremy Howson with his first off the Longbridge line Rover 214GSi.

Chris Langford was keeping up appearances with his stunning Rover 216 Vanden Plas EFi.

The Montego became 40 recently. They rarely looked this good when new.

Traffic Cop Julian Pearson was only interested in Talbot's not tickets that weekend thanks to his Alpine GLS.

Black Beauty – Paul Davies from the SAAB Owners Club and his lovely daily driver – a 900 Turbo 16S.

Ian Cushway searches out **new** and **used** parts prices

VW Golf Mk7

Described by many as the Swiss army knife of cars, there's little to fault with this iconic, evergreen family hatch.

Imitation is the sincerest form of flattery, which is traditionally why folk have willingly splashed a little more cash to buy a Golf. It's a model that's dominated the family hatchback sector for nearly five decades now and has been the industry benchmark rival manufacturers have strived to attain.

And the Golf we're shining a torch on here, the good-looking Mk7 produced from 2013 until 2019, is arguably the best of the bunch.

Sat on VW's MQB platform, at launch there were three- and five-door hatchbacks as well as an estate mated to a range of fast and frugal petrol and diesel engines. We particularly like the 1.4 turbocharged petrol engine which is refined and eager to please, while the 2.0-litre turbodiesel is an obvious choice for anyone doing big annual mileages. There's also a plug-in hybrid in the form of the GTE and even a fully electric e-Golf. And for the more performance-oriented buyer, there was the GTI or frankly awesome Golf R.

Whatever its means of propulsion, this era Golf will be a joy to drive with agile handling, a comfortable ride, good equipment levels and high levels of overall refinement.

The interior is a nice place to be, too – there's a real upmarket feel to the soft-touch trim, while an 8in touchscreen infotainment system with Apple CarPlay adds to the sense of sophistication.

Moreover, there's plenty of leg and headroom front and rear, plus there's an accommodating boot. That said, larger families could always opt for the commodious five-door estate.

Bringing things more up to date, the Mk7 was given a facelift in 2017 when it became the Mk7.5. The updates including some styling tweaks as well as the introduction of new trim levels, a bigger infotainment screen and more efficient engines such as the hugely talented 1.5 TSI.

As you'd hope, reliability is generally good. However, it's worth remembering that the oldest Mk7's are over a decade old now so the years could have taken their toll on reliability if regular maintenance has been missed.

Engines

None of the engines in the Golf are likely to prove particularly problematic, assuming they've had regular servicing. From what we can gather, the 1.0, 1.2 and 1.4 petrols and all diesel engines have a timing belt, while others employ a timing chain – obviously if you're unsure, tap in your numberplate on a parts supplier's website and see if a belt's listed. The belt replacement interval is a matter of hot debate with VW suggesting only a visual inspection of the belt on some engines at 240,000km (150,000 miles), but there's an argument in favour of renewing the belt every

BLUEMOTION
WZ16 LHJ
GB

Which model?

▶ Entry level S trim gets air-conditioning but you'll need to step up to the Match or SE to get alloy wheels and the luxury of cruise control. If you're going for the GTI, try to pick one with the £1000 option when new Performance Pack which gave it a hike in power (to 230bhp), beefier brakes and a limited slip differential. A desirable option for those that like their tunes is the Dynaudio system. The panoramic roof is nice, too, but decide whether its benefits outweigh the risk of it eventually letting in rain water.

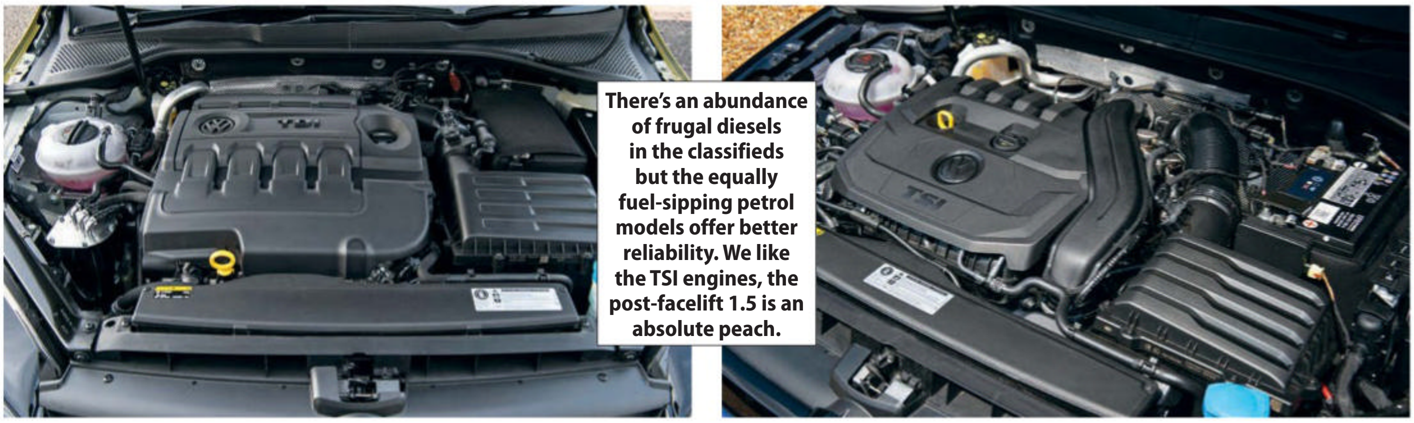
Engine-wise, being that the petrol models tend to enjoy better reliability than the diesels, we'd go for the 1.4 TSI or – if you can stretch to a post-facelift car – the 1.5 TSI. Don't write off the 1.0 TSI, either, as it packs a lot more punch than you might have thought.

Engine component prices

OIL FILTER
Main dealer £14.94
Independent from £4.79

WATER PUMP
Main dealer £160.19
Independent from £52.99

FLYWHEEL
Main dealer £362.70
Independent from £469.99


There's an abundance of frugal diesels in the classifieds but the equally fuel-sipping petrol models offer better reliability. We like the TSI engines, the post-facelift 1.5 is an absolute peach.

four years regardless of mileage. If the front crank oil seal has developed a leak and has contaminated the belt, it will need doing a lot sooner, of course. It is wise to replace the water pump and fit an updated housing at the same time, though it's a time consuming job because you need to remove the sump. The seal in the housing also needs to sit properly otherwise it will leak.

Turbo issues can often be solved by repairing punctures in the actuator diaphragm in situ (a VAG service kit is available) or fitting a replacement actuator rather than having to invest in a new turbo. That said, carbon build up is becoming increasingly common on high milers with a VNT turbo. Either way, access to a full VCDS fault code scan is essential.

As well as EGR valve niggles, diesels can also suffer low pressure tank lift fuel pump issues, detectable by a tractor like sound and the car going into limp-home mode. The problem can be the sensor, but if the lift pump begins to fail it's important to get it replaced along with the controller before it wrecks the engine-driven high-pressure fuel pump as well.

The GTI uses the same EA888 engine as in the Mk6, although a redesign of the timing chain tensioner means its shrugged off its predecessor's reliability issues. That engine likes a sip of oil, so be sure to pull the dipstick on a regular basis. The water pumps are notorious for leaking, too, though in most cases it's the thermostat housing to blame, not the actual pump.

GOLF
TSI
BLUEMOTION
WZ16 LHJ

Brake component prices

FRONT BRAKE DISCS (PAIR)	
Main dealer	**£168.40**
Independent from	**£111.98**

FRONT BRAKE PADS	
Main dealer	**£103.52**
Independent from	**£23.99**

What to pay

▶ Despite their relatively high price tag when new, the Mk7 is now altogether more affordable with the earliest ones kicking off at between **£2500-£3000**. Be warned though – cars at this price are likely to have a good few miles under their belt. A 1.6 TDI with around 100k and a good service history is likely to be around a grand more. For reference, the hugely talented post-facelift 1.5 TSI with the same mileage could be as much as **£8000**, though main dealer cars with 40-60k might be approaching **£12,500**. Sought after GTIs start at **£7000**, though you'll need a budget of **£12,000-£14,000** to get a post-facelift with the desirable Performance Pack.

Estate version is sleek and practical.

Transmission was initially in the form of either a six-speed manual gearbox or six-speed DSG dual-clutch auto, the service interval for the latter being 40,000 miles. The more common 2.0 TDI employs a dual mass flywheel but the 1.6 TDI we're quoting prices for here has a solid flywheel and curiously Volkswagen sell it for less than it's listed for at a nationwide independent.

Steering/suspension

The Mk7 suspension is excellent and provides a comfortable ride without sacrificing driver feedback. A car with lots of miles under its belt, however, would likely benefit from an overhaul,

Steering/suspension component prices

FRONT ANTI-ROLL BAR BUSH	
Main dealer	**£240.59 (complete stabiliser bar)**
Independent from	**£9.45**

REAR SHOCK ABSORBER	
Main dealer	**£123.92**
Independent from	**£80.02**

Running costs

▶ GTI aside, none of the Mk7's will be particularly expensive to run. Arguably, the 1.6 TDI will have the least impact on your wallet with 74mpg possible, just group 11 insurance and in some cases zero road tax. However, the savings can quickly be overtaken by the associated costs of the diesel models going wrong, so in the real world the smaller engine TSI petrol units could prove a better bet. The 1.5 TSI we mentioned earlier is smooth, incredibly rapid, just group 15 insurance and will easily return 50mpg on a run.

Leg and headroom are good in the Golf.

Hatch has 380-litres of boot space, while family-friendly estate offers a commodious 605-litres.

Other component prices

HEATER MATRIX
Main dealer £349.40
Independent from £131.99

AIR-CONDITIONING COMPRESSOR
Main dealer £1101.60
Independent from £269.99

Use of quality materials gives the Golf a classy and refined feel inside.

notably by fitting new wishbone bushes, anti-roll bar droplinks and control arm bushes. The Mk7's rear end is susceptible to bush wear, too, and rear dampers have been known to fail, so check for early evidence of oil on the outside.

See any with the optional Adaptive Chassis Control, which allows the driver to switch between comfort, normal and sports modes, as a bonus – although the shocks themselves are a lot dearer than the standard items.

Brakes

The Mk7's stoppers should haul the car up nice and squarely, so be wary of any that veer under hard braking as it's been known for rear pads to seize in their carriers.

ABS dash warning lights are likely to be caused by an iffy wheel bearing/ABS speed sensor or ring – all the necessary parts are freely available from independents.

Other issues

The heater matrix is tiny on the Mk7 and blocks easily, resulting in no heating. Before a replacement is fitted, it's important to back flush the system and use G12 Evo coolant. Cars were fitted with two different types of heating systems, so you'll need to know which one is on there before ordering.

Apart from general wear and tear items, also check the aircon is blowing chilled air when on, as the Sanden compressor on this car is notoriously fragile. It uses a modulated delivery system and it's usually the N280 valve in the compressor that fails.

USEFUL CONTACTS

AVS Car Parts www.vwspares.co.uk
Bilstein bilstein.com/en
Forum Volkswagen.forum.co.uk

The front radar for the adaptive cruise control is prone to getting water-logged, so make sure it works OK as it's very expensive to replace.

And finally, talking of water damage – the Mk7 is terrible when it comes to cabin leaks so check all the footwells and the boot for dampness. Water mostly gets in via the sunroof, the rear door speakers and rear cabin vents.

Verdict

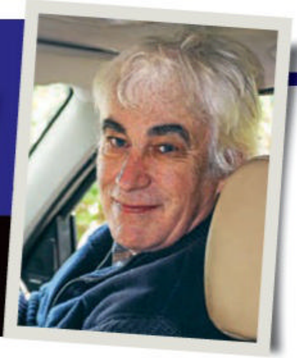
▶ Classy yet classless is probably the best way to describe this era Golf. It's a car with all-round ability that never looks out of place wherever you take it. In terms of class, refinement, build quality and usefulness it still outperforms its rivals – and now prices have softened it makes a great used proposition.

Moreover, for GTI purists, the Mk7 offered the final opportunity to get one in three-door guise as the iconic hot-hatch was only offered as a five-door after this date.

Volkswagen Golf Mk7 2013-2019

Model	1.0 TSI	1.4 TSI	1.5 TSI	1.6 TDI	2.0 GTI
Engine (cc)	999	1390	1498	1598	1984
Power (bhp)	113	120	128	103	216
0-60mph (secs)	9.5	9.0	8.8	10.4	6.3
Top speed (mph)	123	126	130	119	152
Average fuel (mpg)	44.8	54	44.8	74	47

Dealer's Diary



Peter Simpson provides us with an insight into the automotive sales trading world – and beyond.

Jaguar's relaunch

▶ What, exactly, is REALLY going on with Jaguar? So far, we know the following:

1. No new cars will be produced until 2026.
2. When production does restart, Jaguar will be an electric-only brand.
3. When production restarts, the existing 80-strong dealer network will be reduced to just 20.
4. A new logo and branding has been announced, to a somewhat 'mixed' public reaction.

Unsurprisingly, the new image has not been especially well-received by dyed in the wool Jaguar enthusiasts, and there has been much 'discussion' online, little of it favourable. It's impossible to believe, however, that those behind this brand relaunch didn't anticipate the reaction. On the contrary, surely, it's exactly what was expected and will help support their message that the new, 2026-on Jaguar is indeed very different indeed to what came before.

What we're witnessing is a total relaunch of the Jaguar brand – it seems to have been decided that the future of Jaguar is as a top-end premium brand, possibly not far short of Bentley and Rolls-Royce in image. I can totally see that something must be done.

Once upon a time Jaguars were bought by successful young people who saw owning one as a sign of success. The problem, though, is that as those people have aged, so has the perception of Jaguar as a brand.

Then there's a perceived cheapening of the brand. It's true that value for money was always part of Sir William Lyon's philosophy. But more recently, models like the X- and S-TYPE have extended the brand into significantly lower price brackets. Additionally, of course, pretty-much all Jaguars ever made have gone through a 'fast, cheap and thirsty' stage of life when they're considered old-hat by aspirational owners but not sufficiently old to appeal to collectors.

Nowadays, old Jaguars can be found in running and sort-of roadworthy condition from around £6-700. That entry-level reflects the fact that a complete X- or S-TYPE will weigh in for £3-400 as scrap. And £2k will buy you a lovely example – I know, I've done it. And for those of us who like bargains, it's good news.

We may like cheap Jaguars like this 2012 XF which is probably £2-3ks worth at auction, but given that the brand seems to be being relaunched as a low-volume, high-quality and premium-priced product, is it perhaps part of the plan to distance the new Jaguar from stuff like this?

But if you're planning a new range of top-end cars which will be available through a network of just 20 dealers (that's just four more than Morgan) and looking to move your marque significantly upmarket, then maybe, a bit of disassociation with the bottom-end of its previous incarnation is no bad thing. And if you can engineer things so that said association is initiated by the owners of said vehicles rather than the manufacturer, then that's pretty-much ideal…

So maybe, just maybe, all the howls of complaint were part of a carefully engineered plan, and exactly what Jaguar wanted to happen…

The latest scam

▶ Scammers are always inventing news ways to relieve people of their money, and people selling cars are often seen as easy targets. The latest that I've come across goes like this: someone contacts you, and says they want to buy a car, but before they do so, they want you to provide a condition and status check – an HPI-type check in other words.

So far, it all seems fair enough. In fact, it's what every wise purchaser does. Except that the scammer demands that you obtain said report from a specific company you have probably never heard of (though it may sound similar to a legitimate household name company that you recognise) and they will usually provide a link for you to use. Sometimes, the link will be provided after you respond to say that you have never heard of the firm they want you to use. But the link takes you to a fake website and while it may provide you with details of your car, it does this using only information that's available for free.

What they are really interested in is, of course, the bank card details that you use to purchase their report – once they have this information, they can use it to, basically, empty your bank account.

This one is very sneaky, but once you're aware that it's doing the rounds it's actually quite easy to spot…

> *"But the link takes you to a fake website and while it may provide you with details of your car, it does this using only information that's available for free."*

Cars are getting older

▶ According to recent data from the SMMT and reported by *Autocar*, Britain's cars are getting older. Once upon a time, ten years was considered a car's typical life; today, of the 34million cars on the road, 16million (or getting on for half) are more than ten-years-old. Furthermore, of that 16million, 10.5million are over twelve years old.

There are several ways of looking at figures like this. The obvious one is that cars may be lasting longer, and more people are buying used and prepared to spend money on keeping an older car. The new-car market is, of course, changing – although electric car take-up is less than many manufacturers were hoping, in October 2024 electric and hybrid-electric car sales still amounted to 62,646 out of 144,288 new-car registrations, and anything with a traction battery costs more than a vehicle without.

In fact, all new cars are now significantly more expensive than they were 10-15 years ago – again according to the SMMT the average petrol car is now 93% more expensive than its 2009 equivalent, while for the average diesel car the price differential between 2009 and now is 129%.

Since 2009 the diesel market has been transformed; back then diesel was still considered by many to be the fuel of the future for private cars, and manufacturers were pulling out all the stops to make diesel cars as efficient and accessible as possible. Nowadays diesel demand has diminished dramatically – of that 144,288 new car registrations in October 2024, just 8961 were diesels, compared to 72,681 with petrol engines.

For me, though, the most interesting aspect of all this was the pretty significant drop in just two years between ten and twelve. Over one third of the cars which make it to ten-years-old don't make it past twelve! These days, body corrosion isn't the big car-killer that it once was – most cars that die do so due to accident damage, mechanical failure or needing an uneconomical amount of MOT repair.

Nearly half the cars on Britain's roads are now over ten-years-old, but a third of those that make their tenth birthday don't make their twelfth.

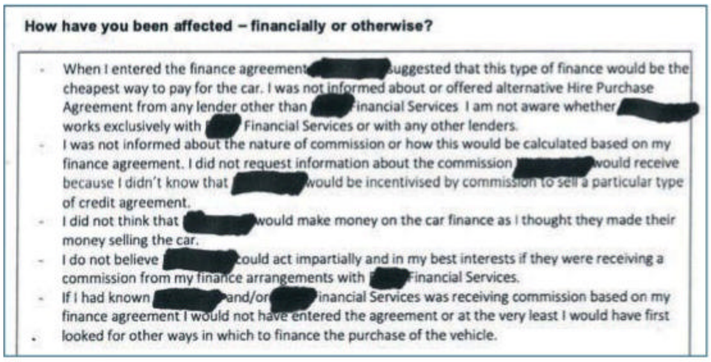
Or, in a surprisingly high number of cases, because it goes in part-exchange to a dealer for who scrapping is less hassle than trying to punt it out through the trade or at auction. These days, pretty-much anything that's complete can be weighed in for at least £200, and values of £3-500 are far from uncommon. To obtain this, all the dealer needs to do is go online or pick up the phone and await collection. Spending a bit of time may elicit a bit more. But that time will usually earn more if devoted to the core business of sourcing cars for retail, prepping and selling them!

For those who trade at the 'affordable' end of the market though, it's well worth bearing in mind that a ten-year-old car has, statistically, a one in three chance of not lasting more than another couple of years.

Finance commission claims

▶ I reported last month that on October 24 the appeal court ruled that customers who bought cars on dealer finance were entitled to know if the dealer was receiving commission and how much. Most finance providers stopped taking new applications while they sorted out their paperwork etc., to comply. Most, it seems, have now done this, and everyone is getting used to the new arrangements though understandably, by no means all sales staff are happy about customers being privy to this information.

However, the next stage of all this now seems to be getting underway, with past customers who were not given this information (which the court has found they were entitled to) starting to make claims for compensation. What will happen with these claims is yet to be seen, not least because Close Brothers are appealing the appeal court's decision to the Supreme Court. It will also most likely be the finance company that has to pick up the cost of compensation, as the dealers are following their procedures, and their forms didn't include any providing for customers knowing the dealer's commission.



How have you been affected – financially or otherwise?

- When I entered the finance agreement [redacted]uggested that this type of finance would be the cheapest way to pay for the car. I was not informed about or offered alternative Hire Purchase Agreement from any lender other than [redacted]inancial Services I am not aware whether [redacted] works exclusively with [redacted] Financial Services or with any other lenders.
- I was not informed about the nature of commission or how this would be calculated based on my finance agreement. I did not request information about the commission [redacted]would receive because I didn't know that [redacted]would be incentivised by commission to sell a particular type of credit agreement.
- I did not think that [redacted]would make money on the car finance as I thought they made their money selling the car.
- I do not believe [redacted]could act impartially and in my best interests if they were receiving a commission from my finance arrangements with [redacted]Financial Services.
- If I had known [redacted]and/or [redacted]inancial Services was receiving commission based on my finance agreement I would not have entered the agreement or at the very least I would have first looked for other ways in which to finance the purchase of the vehicle.

However, it's likely that claims will initially be made against the dealers themselves, and I've seen a few already which follow the pattern seen here. The claims appear to have been crafted by someone who knows exactly what they are doing (a no-win, no fee claims management company perhaps?), and the points raised match pretty-much exactly the points on which the court of appeal found against the finance companies. For example, the court held that customers were entitled to know that dealerships earn money from selling finance – the claim wording states that the customer making the claim did not.

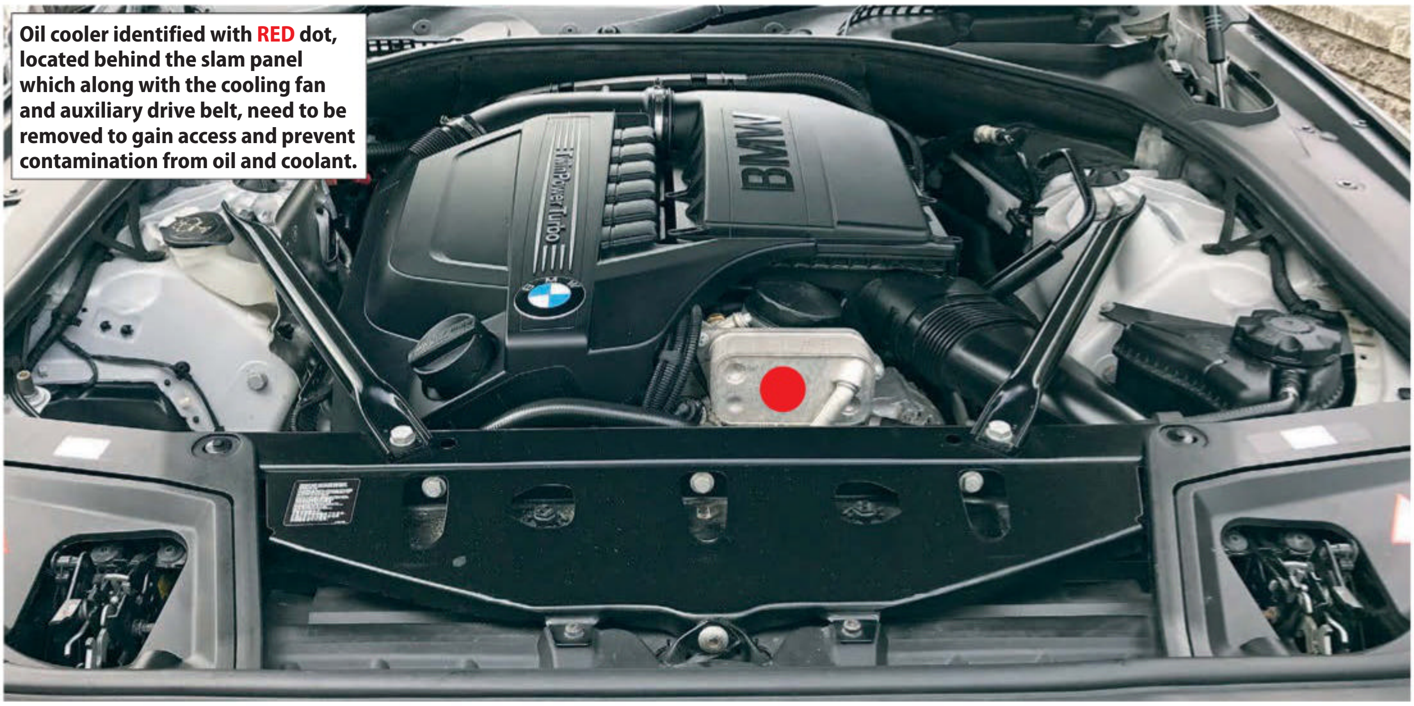
How all this will end up I've no idea; I believe that the legal support bodies who represent the trade are currently working on their response, and in any case if it may all end anyway if Close Brothers win at the Supreme Court.

But if they don't, then it's quite possible that every customer going back years will be able to reclaim the entire amount of commission the dealer received, plus several years interest. And I'm sure they'll be no shortage of ambulance-chasers willing to help people claim every penny.

Yes, people are entitled to compensation if they've been wronged. But somewhere along the line, it must be paid for, and the only way I can see for the compensation to be funded is dealer supplied finance in future being a lot more expensive.

BMW 5-Series

Oil Cooler & Oil Filter Housing Gasket Renewal



Oil cooler identified with RED dot, located behind the slam panel which along with the cooling fan and auxiliary drive belt, need to be removed to gain access and prevent contamination from oil and coolant.

Andrew Rolland shows us how he tackled a common BMW problem.

The BMW petrol 4 (N4X) and 6 (N5X) cylinder N-series engines, fitted to a number of BMWs can suffer from oil leaks from the oil cooler gaskets and the N55 engine in my 2013 F10 BMW 535i is no exception. The nub of the problem is that if oil, in sufficient quantities, leaks from these gaskets, it can then drip onto the auxiliary drive belt beneath. This can damage the belt and to an extent it can be flung off the crankshaft pulley and can damage the main crank seal leading to a potentially engine killing oil leak.

Oil flows out of the cylinder-head from a main oil gallery direct from the oil pump to be filtered in the oil filter, from the oil filter it then goes into the oil cooler. Once cooled by engine coolant, it flows back into the oil filter housing and then returns to the cylinder-head where it then feeds the main bearings and the valve train. Thus, between all these parts where the oil is pumped, filtered, and cooled there are a couple of gaskets to pass through before it gets to do the essential jobs that it is there for.

The coolant from the oil cooler returns to the water pump by an external hose in front of the engine which is affectionately known as the Mickey Mouse hose due to the shape of the plastic flange and its infamous reliability. To do this job, you need to remove this hose, so I opted to replace it while I was in there.

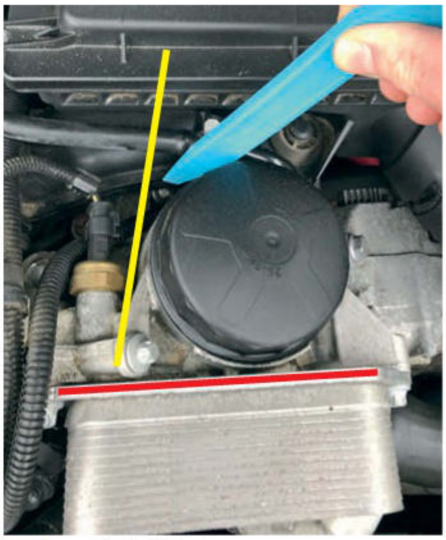
This job has been on my "To do list" for some time now. Following a recent oil service, I noticed that the oil sweat from the notorious oil cooler gasket on my engine looked just a little bit worse than I remember it being. Nothing for it but to drain down the cooling system and move the inlet manifold to sort it.

TOOLS NEEDED

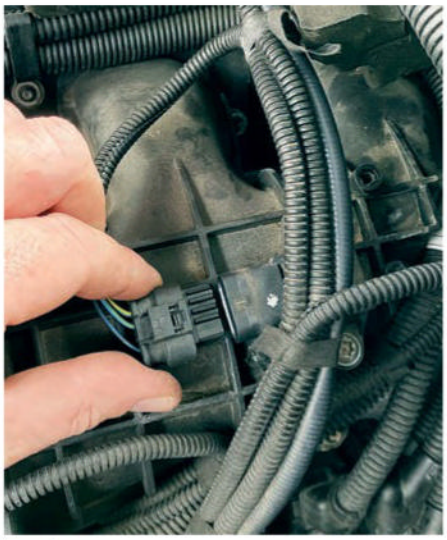
- ¼in-½in drive ratchets and extensions
- 6-15mm sockets
- E10 and E12 Torx sockets (deep)
- T60 Torx bit and locking pin for belt tensioner

PARTS NEEDED

- Oil filter housing gasket
- Oil cooler gasket
- Oil filter
- Oil LL04 spec to match what's in the sump
- Coolant (G11/G48 or LC87)

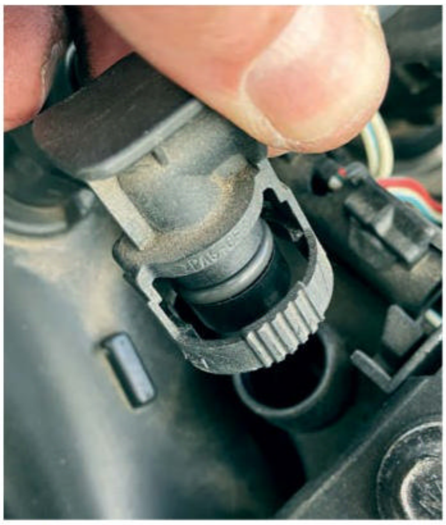


1 The YELLOW line shows the location of the cylinder-head to oil filter housing gasket and the RED line is the location of the oil filter housing to oil cooler gasket. Just visible is the bolt that requires the inlet manifold to be moved to gain access.

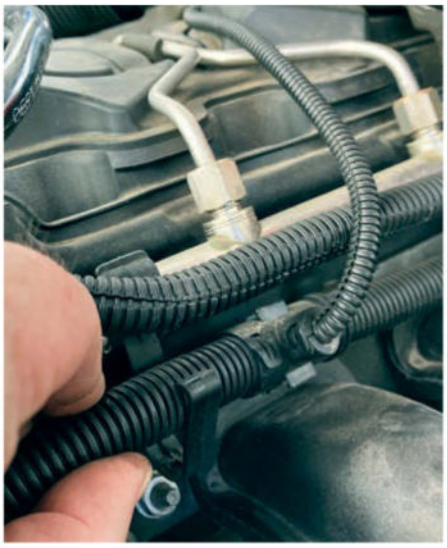


2 After removing the decorative engine cover and air box, I cover the inlet to the MAF with an orange glove to prevent debris falling in and set to work on unclipping various wiring connectors from the sensors on the inlet manifold.

3 One of many delicate vacuum lines needs to be gently persuaded from its securing clip, the vacuum line to the right is obscuring the manifold securing bolt between cylinders #1 and #2 which is…

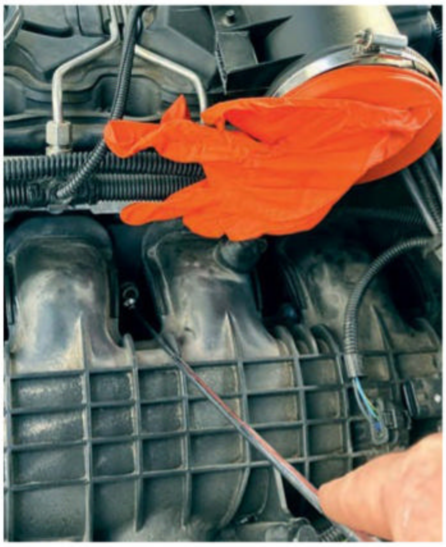


4 …even more delicate than the vacuum line in Step 5 and is released from the cylinder-head cover vacuum reservoir by pressing in the serrated parts of its fixing.



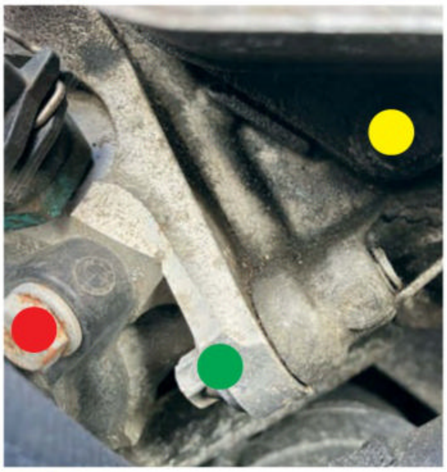
5 Yet more wiring that runs the length of the cylinder-head needs to be moved to gain access to the manifold fixings.

6 A long ¼in drive extension and an 11mm socket is needed to get to the rearmost manifold fixing. What I should have done and did so later was to remove the short length of ducting containing the MAF.

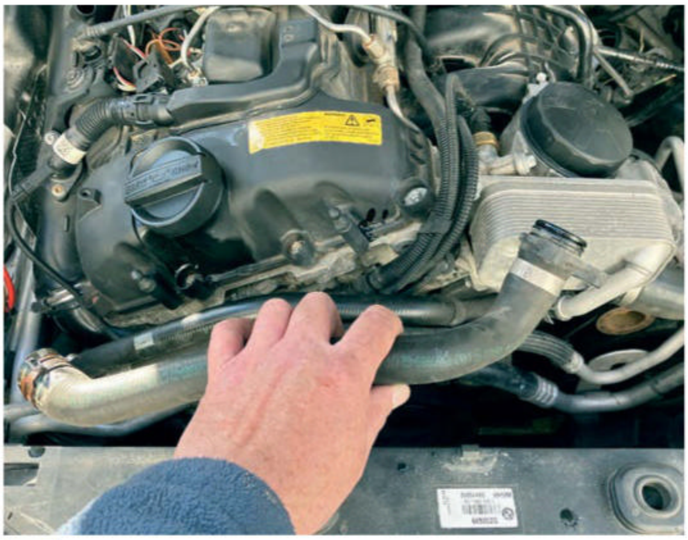


7 My fingers are too fat to fit in the gaps between the manifold runners so a magnetic pick up tool comes to the rescue.

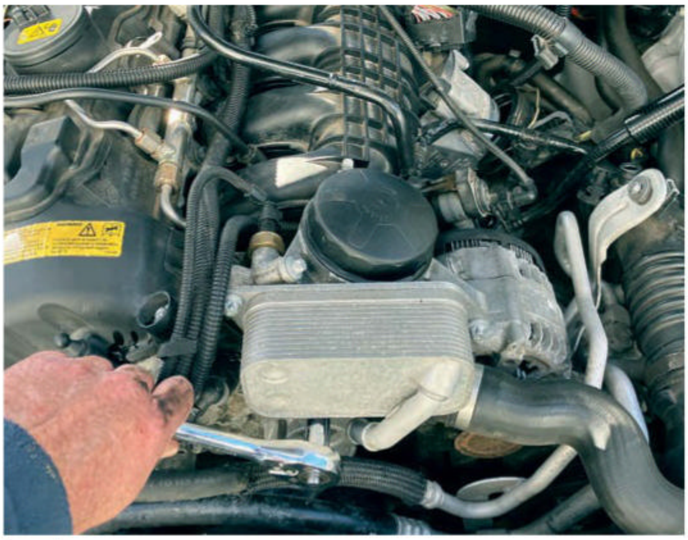
8 To allow the manifold to move sufficiently far enough upwards on its studs, I disconnect three of the wiring looms from the Digital Motor Electronics (DME) and release the main inlet duct from the throttle body. Then drained down the cooling system.



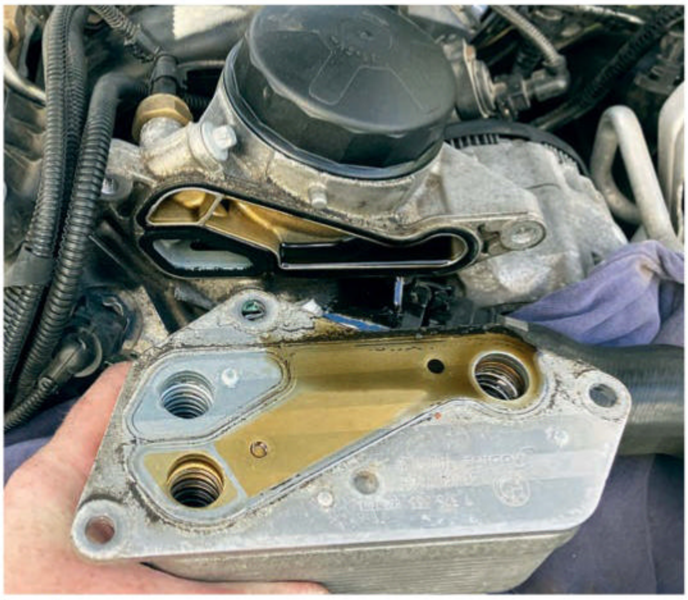
9 8mm bolt (RED dot) holding the Mickey Mouse flange to the head which needs to be removed to allow you to undo the lower oil filter housing bolt (GREEN dot) and the lowest oil cooler bolt (YELLOW dot) can be just seen covered in oil from the failing gasket.



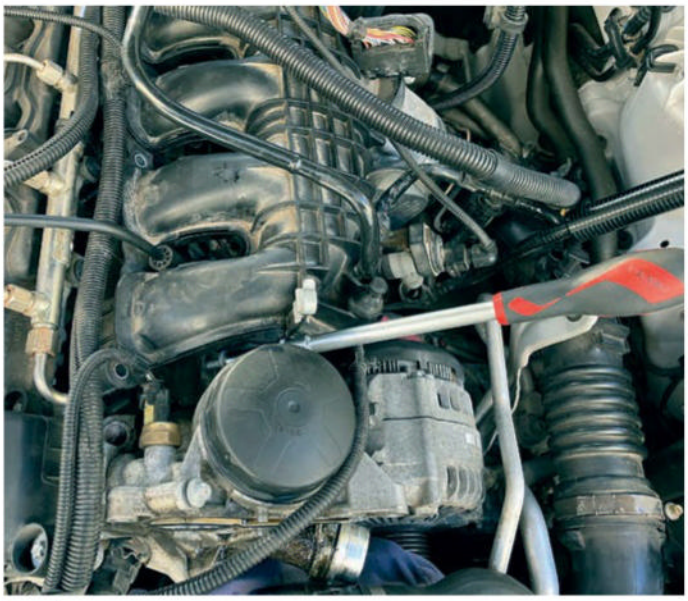
10 Remove the bypass hose from the car and bin it, the plastic flange which looks like Mickey Mouses' head that bolts it to the cylinder-head is another weak point on these engines – it can break, and you lose all your coolant.



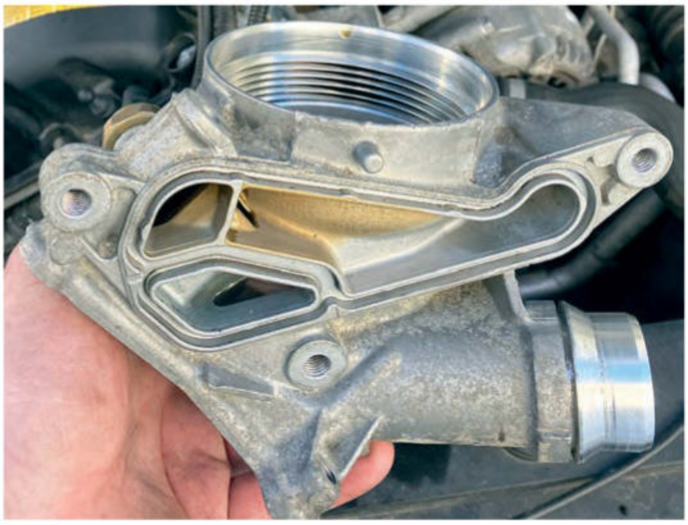
11 The return coolant hose from the oil cooler was removed next. With the auxiliary drive belt removed and the tensioner locked off, the actual work to get to the gaskets can begin. Using a deep E12 socket, the lowest cooler bolt is loosened.



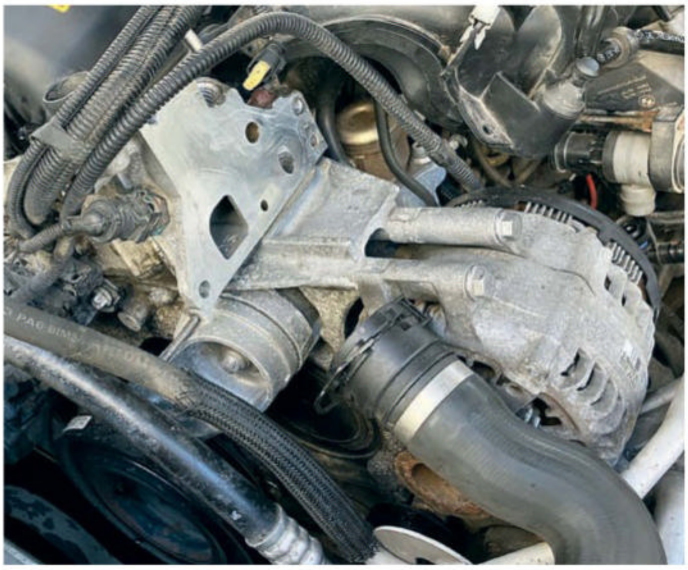
12 The oil cooler is off, and a rag was used to catch the worst of any oil and coolant escaping from the oil filter housing. I'll clean up the cooler later.



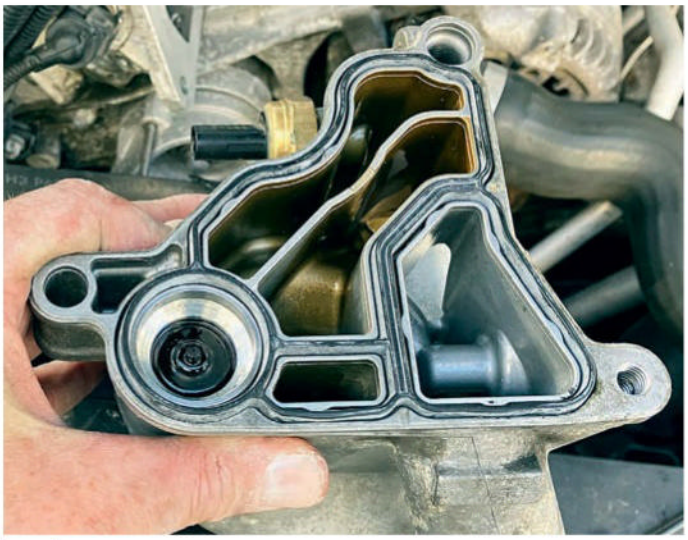
13 With the inlet manifold slid up off the head and sitting on the top of the studs, access to that bolt was gained so that at last, the oil filter housing could be removed from the cylinder-head.



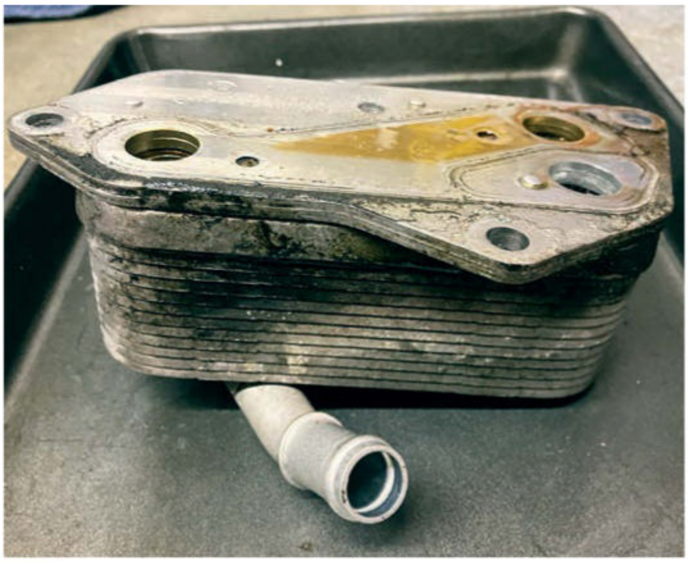
14 The oil filter was removed, and the oil filter housing given a thorough clean with an old toothbrush and brake cleaner. The old gaskets – which had flattened and become brittle – were removed from their recesses with a pick tool.



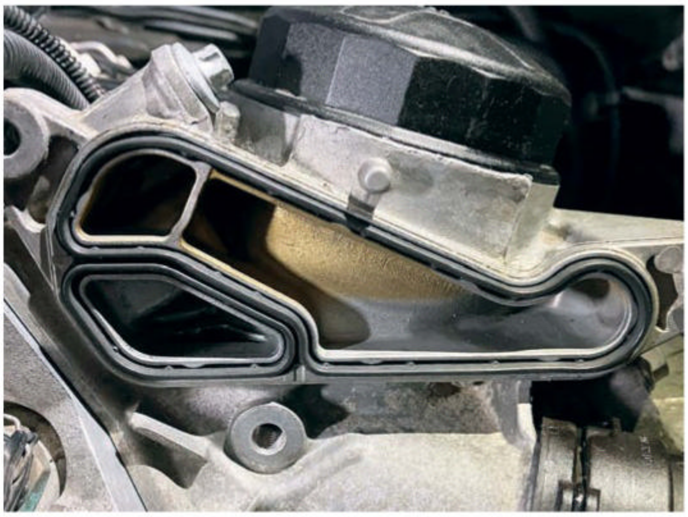
15 That's it all stripped down and the cylinder-head mating surface cleaned up with nothing more than a rag and brake cleaner.



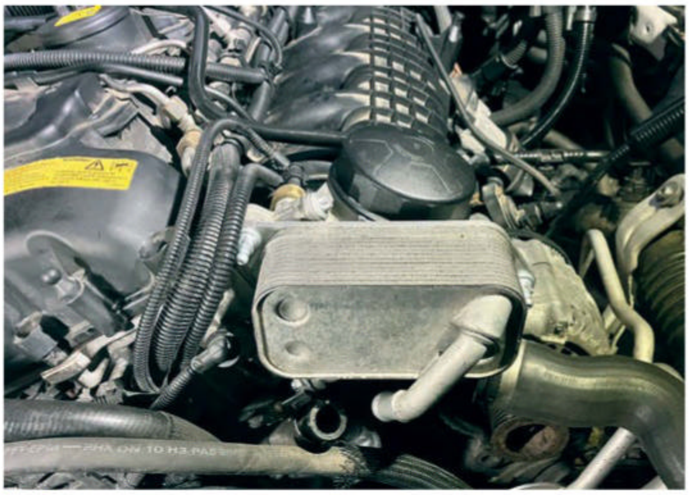
16 A new cylinder-head to oil filter housing gasket was carefully fitted into the cleaned out recess. These gaskets not only seal the oil and coolant passages between the parts but also prevent letting the two incompatible fluids mix.



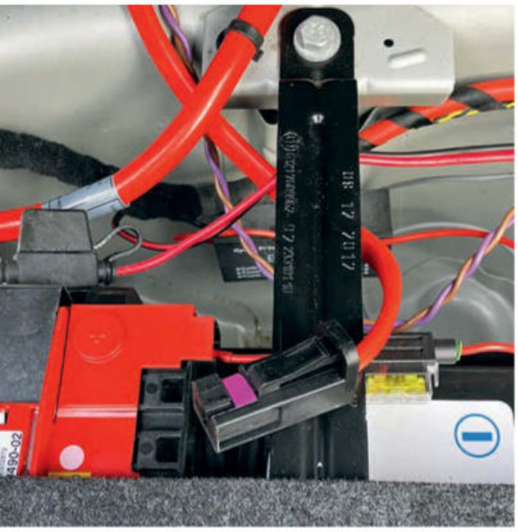
17 Evidence of the oil sweat can be seen on the underside of the oil cooler. It was given a scrub clean with brake cleaner like the oil filter housing and the oil passages cleaned out.



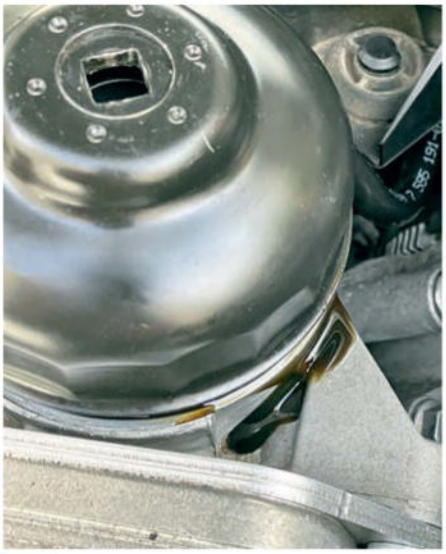
18 A new febi oil filter was installed, and the main radiator hose reconnected to the oil filter housing. A new oil cooler gasket was positioned ready to accept the cleaned up oil cooler….



19 …which was fitted with new bolts. The new bolts have a longer deeper head on them needing a special trip to Machine Mart to buy a set of Clarke deep ETorx sockets. Repeat the steps in reverse to reassemble the engine. Refer to *CM* May 2024 for cooling system refilling.



20 As I have disturbed the main oil line between the pump and the big ends it is recommended to prime the engine, so the big ends aren't starved of oil on start-up. To do this, disconnect the power supply to the DME thus preventing the engine from firing allowing the engine to crank over on the starter.



21 After cranking the engine over three times for 10 seconds, unscrew the oil filter cap and check that oil is present in the filter housing. As you can see a dribble came out ensuring the oil system is fully primed and my bearings saved from being starved.

22 Once the engine is up to operating temperature, top up the oil level with the same oil that's in the sump. This engine needed 250ml to bring the level back up to the correct level. After a test drive, 200ml more coolant was added to finish the job.

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Service Bay

2017 Jaguar F-PACE 3.0 TDV6

Overall difficulty rating

Servicing Jaguar's SUV

Rob Hawkins follows independent Jaguar specialist Tasker & Lacy of Leeds servicing an AWD 2017 F-PACE.

THANKS TO
Tasker and Lacy
0113 274 3362
taskerandlacy.com

The SUV-styled Jaguar F-PACE first appeared in 2016 and was revised in 2020. Under the skin, there are many familiar components that are fitted to other Jaguars, such as the suspension, brakes, gearbox and a range of engines.

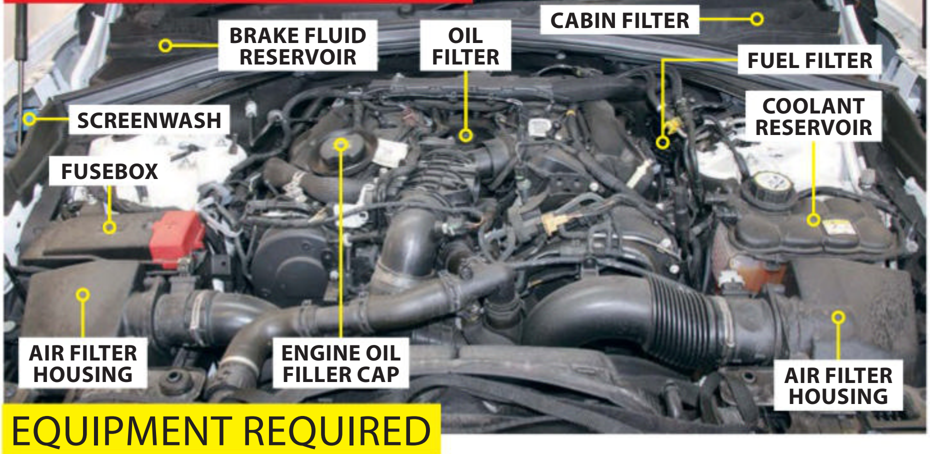
The F-PACE shown here was registered in 2017, so it's quite an early example. It has the 2993cc TDV6 motor, which is quite straightforward when it comes to routine servicing, although more of a handful for the bigger jobs, such as replacing the timing belt.

We asked independent Jaguar specialist Tasker & Lacy of Leeds to outline some of the typical problems that can be spotted when servicing an F-PACE. There are a few potentially expensive problems, such as a worn bush for the rear lower suspension arms. The bush is part of the hub assembly, and we couldn't find a replacement bush, so if it's worn, the only solution is to buy a complete hub at around £560.

Rob says

▶ The F-PACE may have an aluminium exterior, but don't assume that its underside will be free from corrosion. The steel subframes can corrode, so treat any surface corrosion before it goes too far.

Underbonnet layout



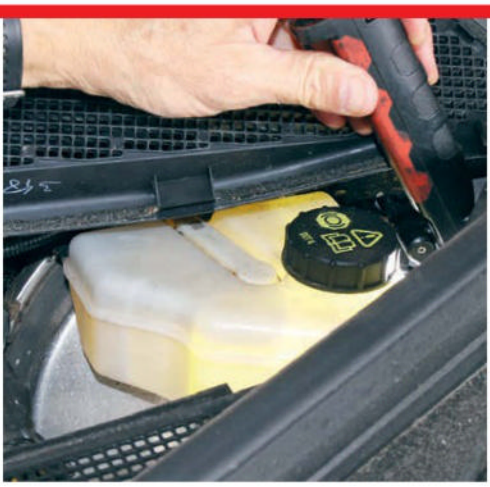
EQUIPMENT REQUIRED

› jack › axle stands (or ramp) › oil drain bowl › 10-30mm sockets/spanners › Torx T25 bit › screwdrivers › pry bar › battery tester or multimeter › spray grease › copper grease › tyre pump/gauge › torch › torque wrench › clean measuring jug › brake pad thickness gauge › Vernier calipers or digital Verniers › antifreeze hydrometer › trim tools › breathing mask › wire brush or wire wheel with drill.

UNDERBODY CHECKS

1 TOP UP SCREENWASH

The screenwash reservoir is next to the offside inner wing. Release the blue-coloured lid to pour the screenwash in until it's full. Operate the wipers and screen washers (front and rear) to check the spray pattern.

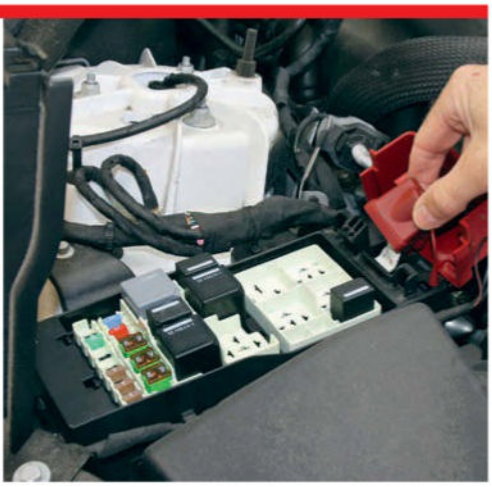


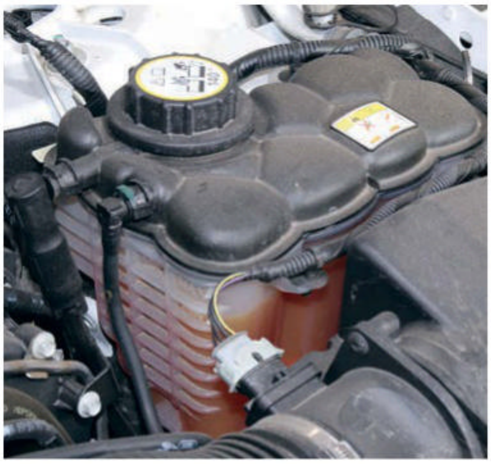
2 CHECK BRAKE FLUID

Unclip a plastic cover in the offside rear corner of the engine bay to reveal the brake fluid reservoir. Shine a torch on the side of it to check the fluid level inside against a maximum marker on the outside.

3 INSPECT FUSEBOX

There's a fusebox on the offside of the engine bay. Release its plastic lid to look inside for water ingress and corrosion. Release the red plastic cover next to it (for connecting a jump pack) to check it's clean. And check the earth connections on the adjacent suspension turret are secure and clean.



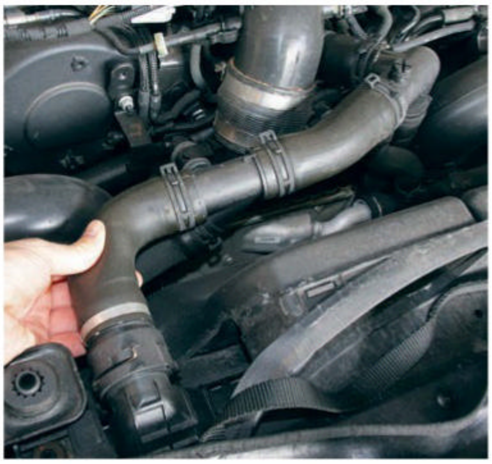


4 CHECK COOLANT

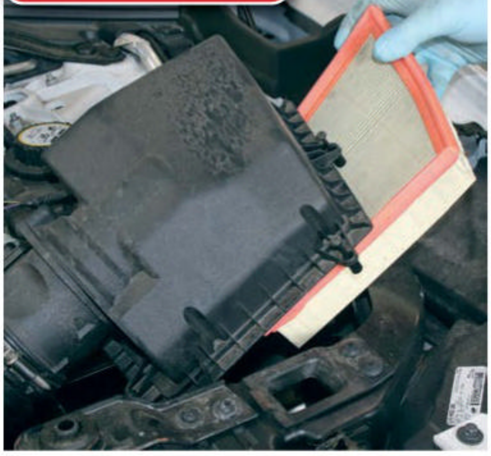
The coolant expansion tank is on the nearside of the engine bay. The level inside can be checked from the outside (shine a torch on it to help). If the engine is cold, release the pressure cap and test the freezing and cooling capacity of the coolant with an antifreeze hydrometer. It should be replenished every 10 years or 160,000 miles.

5 SQUEEZE HOSES

Providing the engine is cold, squeeze any coolant hoses inside the engine bay to look for perishing and leaks. Trace the hoses to their ends to check they are securely fitted and not leaking (look for pink residue).

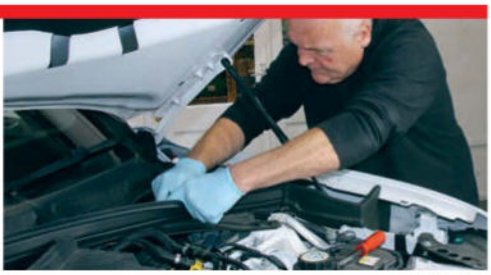


OIL & FILTERS



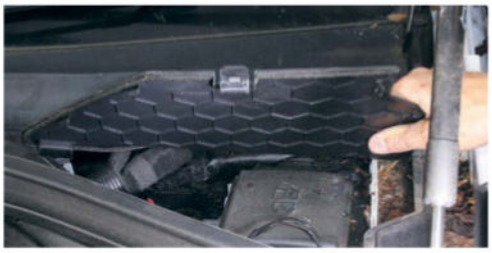
6 REPLACE AIR FILTERS

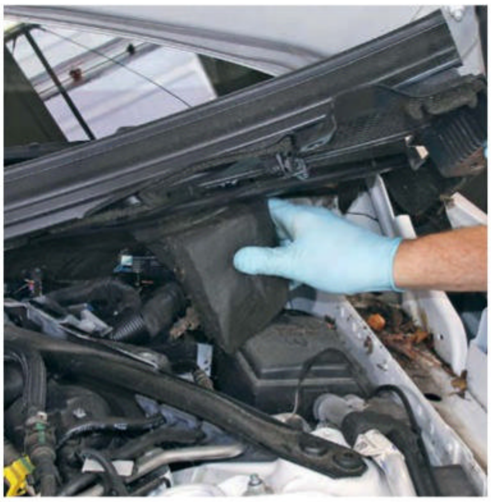
There are two air filters, contained inside plastic housings in the front corners of the engine bay. Release the lid of each housing by undoing seven Torx T25 screws. There's room to extract the air filter, clean inside the housing, fit the new one and refit the lid.



7 DETACH TRIM

The cabin filter should be replaced by removing the glovebox, but T&L has discovered a quicker method by accessing it via the engine bay. First, unclip a cover in the nearside rear corner of the engine bay. Undo five plastic trim plugs and release the trim below the nearside of the windscreen and around this area of the engine bay.



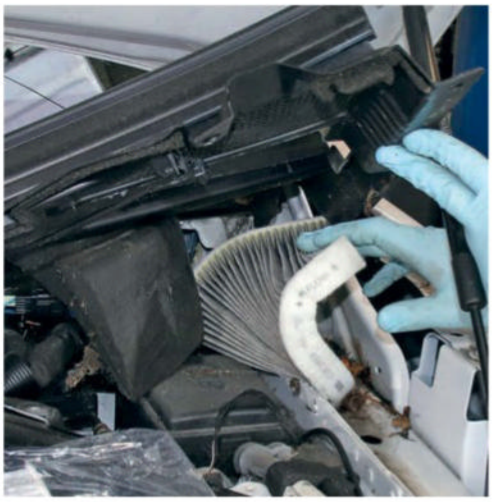


8 EXTRACT FOAM BLOCK

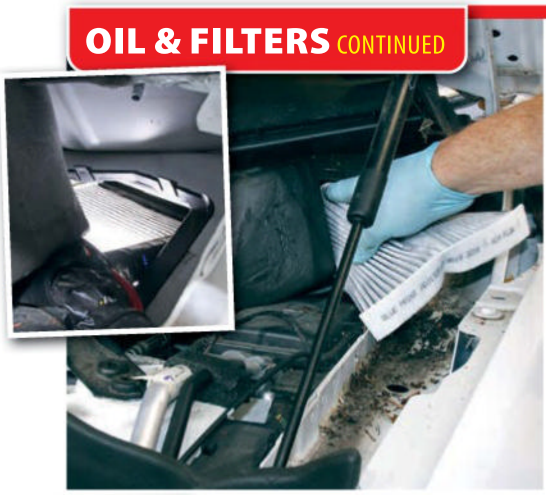
Lift the trim shown here to see a large block of foam. Carefully pull this out to reveal the cabin filter hidden behind it – shine a torch inside the area to see the cabin filter and to check how it is fitted, especially the direction of the pleats and any airflow arrows on the side.

9 EXTRACT OLD CABIN FILTER

Carefully remove the old cabin filter. You will need to fold it a little to remove it. Check the new cabin filter is the same shape and size as the old one. Look at how it will be fitted and make sure any airflow arrows are pointing in the correct direction (pointing down).



OIL & FILTERS CONTINUED

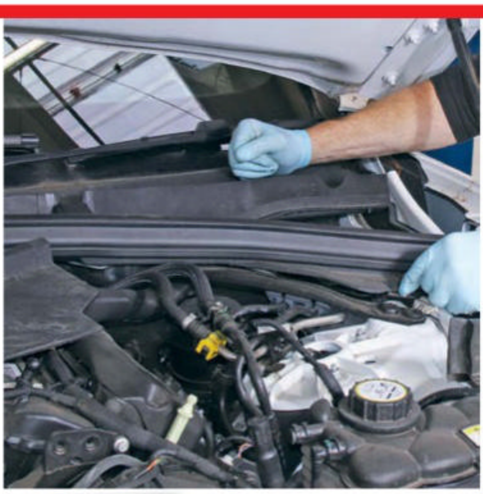


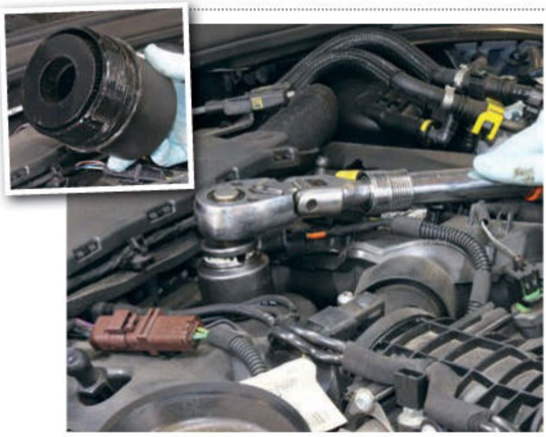
10 FIT NEW CABIN FILTER

The new cabin filter will also need to be slightly folded to squeeze it into the area where it needs to be fitted (inside a plastic housing/tray). It will spring back into shape afterwards. Once fitted, shine a torch on it to check it's fitted correctly, as shown here.

11 REFIT TRIM

The plastic trim that was detached in Steps 7 and 8 needs to be refitted. The trim along the base of the windscreen may need a few gentle taps with your hand to clip it back into position. It's important it sits flush with the glass to avoid the risk of water running inside but be careful not to hit the glass too hard as it can crack.





12 RELEASE OIL FILTER

Remove the upper engine cover (clipped into position) and use a 30mm socket to release the oil filter in the middle of the engine. Leave it for a couple of minutes to allow any oil inside to drain before removing it fully.

13 REMOVE UNDERTRAY

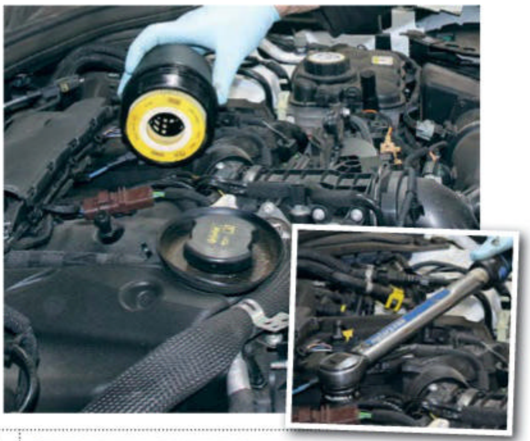
The oil sump drain plug can be removed to drain the engine oil, or it can be sucked out of a dipstick-style tube on the nearside of the engine bay. If you wish to remove the drain plug, the undertray will need to be removed, which is secured with 21 10mm bolts.

14 DRAIN OIL

With a container or drain bowl underneath the sump, undo the 13mm drain plug and leave the oil to drain for several minutes. There should be around seven litres to collect. Afterwards, fit a new drain plug.

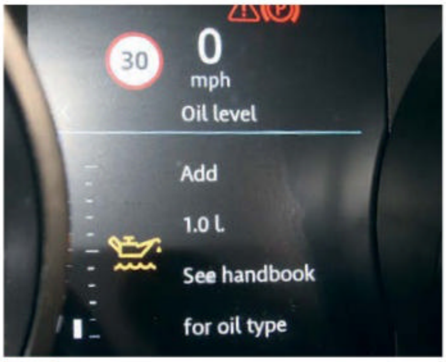
15 FIT NEW OIL FILTER

Replace the rubber O-ring from around the thread of the plastic oil filter top/housing that was removed in Step 12. Extract the old oil filter and fit a new one, making sure it clicks into position. Refit this assembly on to the engine, tightening it to 27Nm.



16 REFILL ENGINE OIL

Measure six litres of 5W-30 fully-synthetic engine oil into a clean jug and pour this into the engine via the filler cap. Whilst the maximum volume of oil is seven litres, it's worthwhile adding less and checking it instead of adding too much.



Oil level

Add

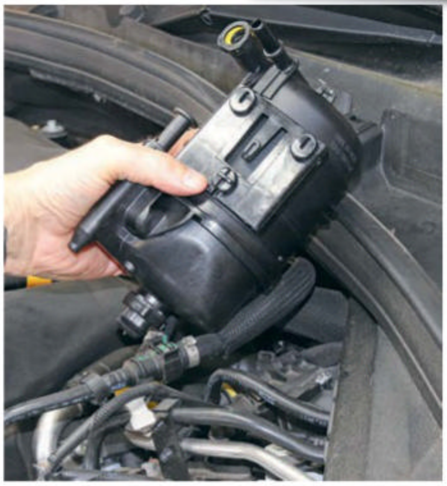
1.0 L

See handbook

for oil type

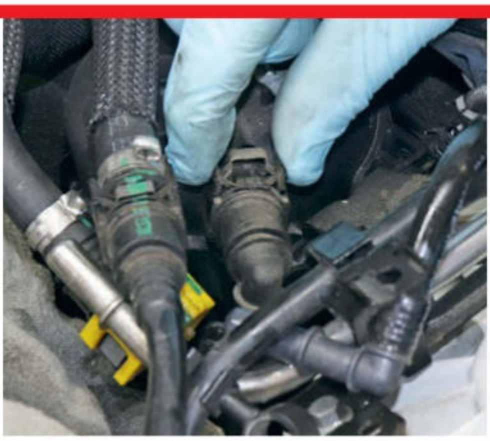
17 CHECK OIL LEVEL

Switch on the ignition, but do not start the engine. Operate the dashboard menu to check the oil level. If a message appears that it cannot be read, try pressing the cancel button for cruise control several times and this may override it. Otherwise, wait 15 minutes before attempting to check the oil level again (switch the ignition off in the meantime). Top up if required, then run the engine to check for leaks.



18 FIND FUEL FILTER

The fuel filter is located in the nearside rear corner of the engine bay. It helps to have the new fuel filter to hand to see how the old one is fitted, especially how it's mounted.

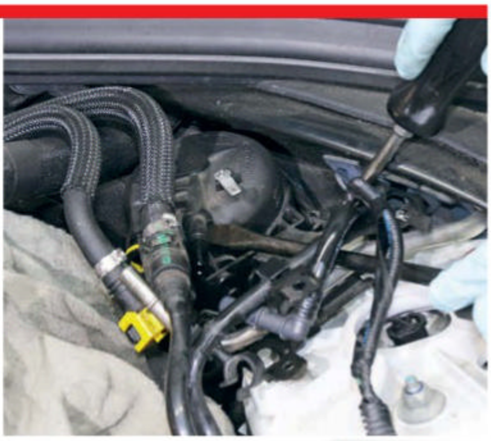


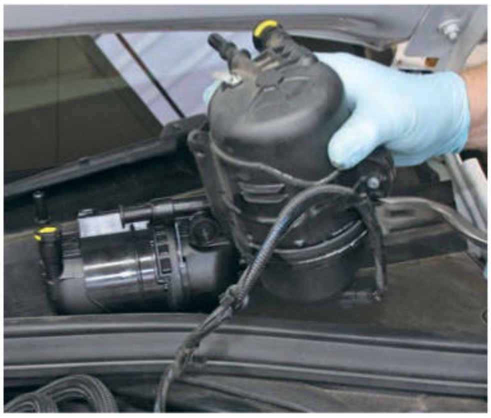
19 DETACH FUEL PIPES

Release the two fuel pipes fitted to the top of the old fuel filter. They are each secured with quick-release clips that need to be lifted up. Also, detach an earth wire to the top of the fuel filter.

20 RELEASE FUEL FILTER

The old fuel filter sits on a mounting bracket. There's a plastic tag on the side of it (see the photo for Step 18) that needs to be released with a trim tool. This is quite awkward to do, so take your time to avoid breaking anything.



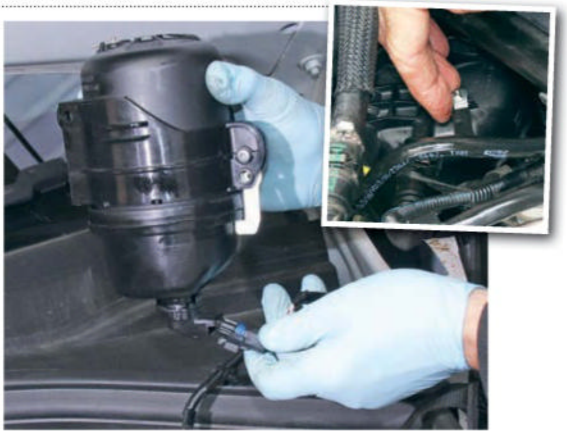


21 REMOVE FUEL FILTER

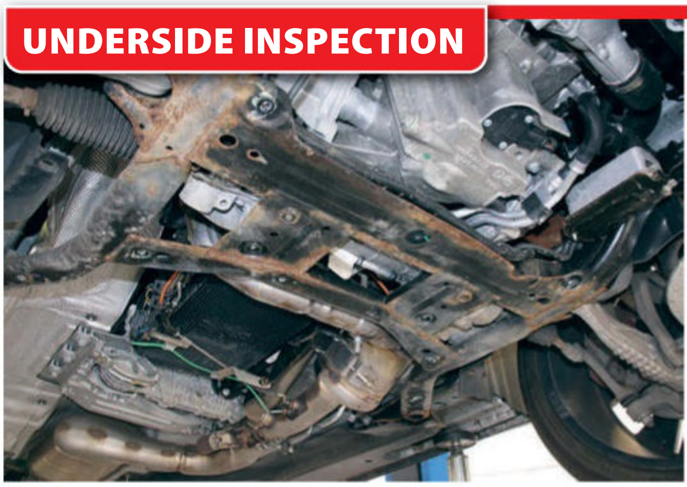
Once the old fuel filter has been released from its mounting bracket, lift it up and out of the engine bay. Detach a wiring plug on the base for a water sensor and also unclip its wiring from the body of the fuel filter.

22 FIT NEW FILTER

Fit the new fuel filter, connecting the wiring plug for the water sensor before lowering it into position inside the engine bay. Refit the earth wire and two fuel pipes. Switch the ignition on and off three times to prime the filter (check for fuel leaks), then start the engine.

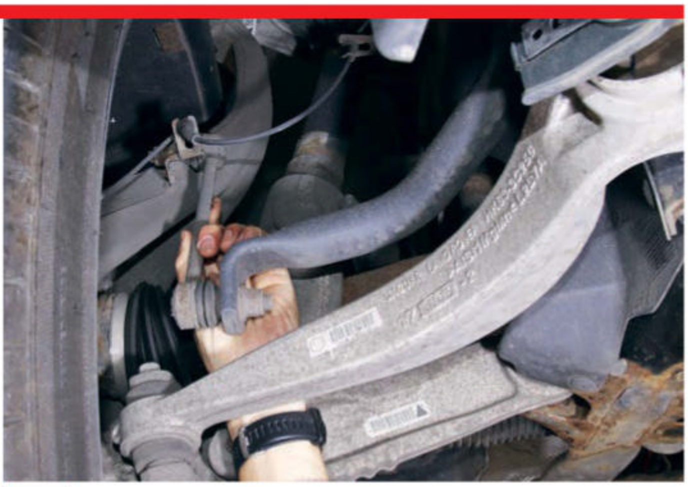


UNDERSIDE INSPECTION



23 CHECK FRONT SUBFRAME

If the undertray was removed in Step 13, this is a good opportunity to look around the engine for leaks. It's also a chance to inspect the condition of the front subframe, which may have surface corrosion that should be treated before it gets any worse.



24 CHECK DROPLINKS

There are anti-roll bars at the front and rear of the F-PACE. Check the condition of the dust covers for the balljoints on the ends of the droplinks, looking for perishing and cracks that could allow water and dirt inside, resulting in premature wear (and a knocking noise when driving).

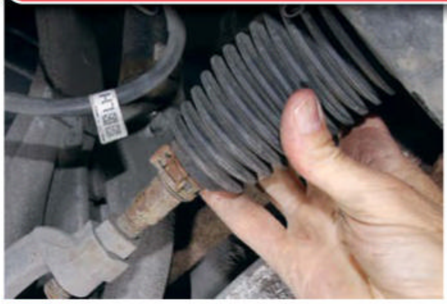
25 LEVER BANANA ARMS

The front track control arms (also called banana arms) are found on many Jaguars and the frontmost bush can wear, resulting in uneven tyre wear and handling problems. Lever against it with a pry bar to feel for excessive movement. The bush or the entire arm can be replaced.

26 TEST OTHER FRONT BUSHES

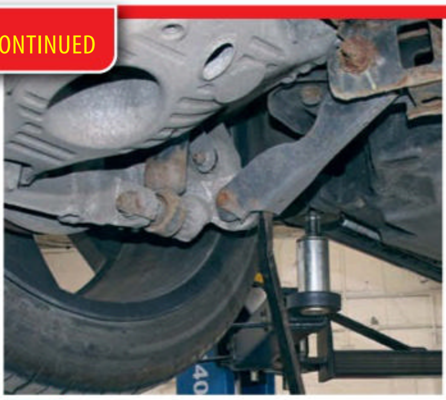
Use a pry bar to check the mounting bushes for the lower arms and coilovers at the front of the F-PACE. The bush for each coilovers' lower mount can wear, resulting in a hollow knocking noise when driving.

UNDERSIDE INSPECTION CONTINUED



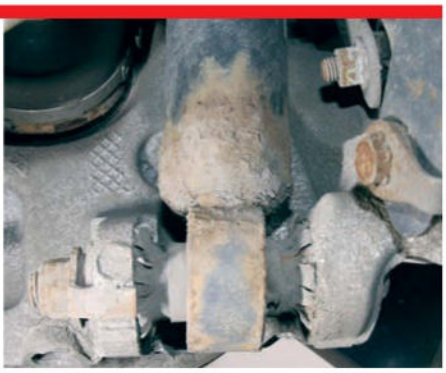
27 SQUEEZE BOOTS

Pinch and squeeze the corrugated rubber boots for the front driveshafts and the steering track rods to look for splits that could let water and dirt inside, leading to premature wear. Check the balljoints for the track rod ends, which T&L has found can wear on early models and cost around £22 each to replace.



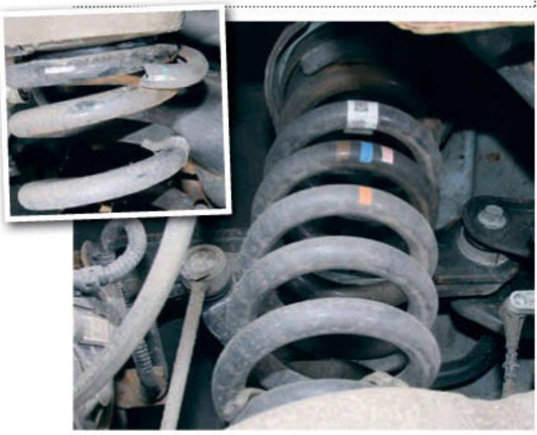
28 CHECK REAR LOWER ARM

According to T&L, the outer mount for the rear lower suspension arms can wear. If the bush is worn, the only solution we can find is to replace the hub assembly, which costs around £560! This bush is more susceptible to wear on vehicles with larger wheels.



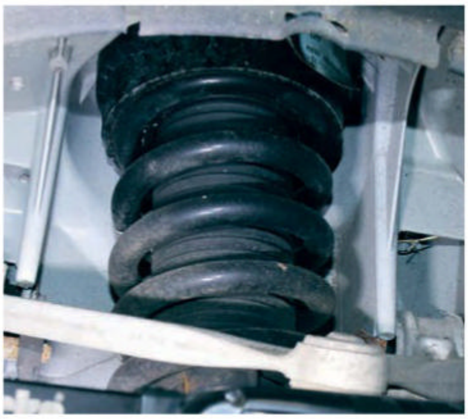
29 INSPECT REAR DAMPERS

Check the rear telescopic dampers for leaks (misting) and corrosion. Visually inspect the bushes for the lower mountings which, as shown here, can perish, resulting in movement of the bush (test it with a pry bar) and potentially a hollow knocking noise from the rear when driving the vehicle.



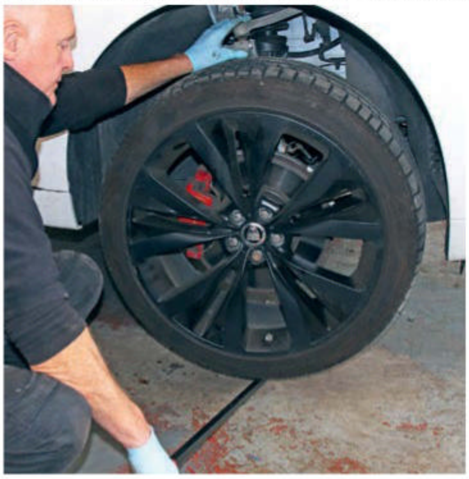
30 CHECK REAR COIL SPRINGS

Visually inspect the rear coil springs from the underneath of the vehicle, along with the lower suspension arm they sit on. Look for corrosion and fractures of the coils. Check the rubber mounts and covers are fitted and haven't deteriorated, unlike the one shown here.



31 INSPECT FRONT COIL SPRINGS

There's space over the tops of the front tyres to check the front coil springs, especially if the vehicle is raised, allowing the suspension to hang down. Similar to the rear coil springs, look for fractures and corrosion.



32 TEST UPPER WISHBONE

With the front of the vehicle slightly raised so that the front tyres are off the ground by a couple of inches, lever a pry bar against the raised wheel whilst gripping the upper wishbone. The leverage will help to identify any play in the upper wishbone. A replacement wishbone costs between £75 and £140.

33 INSPECT PROPSHAFT FLANGES

There are grease-filled flanges at the front and rear of the propshaft, which can be visually inspected from underneath the vehicle. If they are coated in grease, it's likely that the grease inside has escaped, so the entire assembly needs to be replaced.

BRAKES & WHEELS

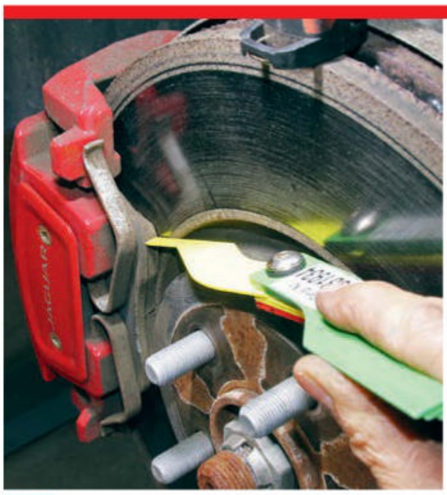
21.5mm
22mm
27mm
21mm
22.5mm
27.5mm

34 REMOVE ROAD WHEELS

Undoing the wheel nuts to be able to remove the road wheels can go horribly wrong because the wheel nuts can swell, which is a problem on many Jaguars. T&L has a set of oversize sockets (eg. 21.5mm for a 21mm wheel nut) to help here. And if you manage to undo the wheel nuts, the wheels may be seized on to the hubs – loosely refit three wheel nuts, then position a length of wood across the inside of the tyre and wheel and tap it with a hammer to help release the wheel.

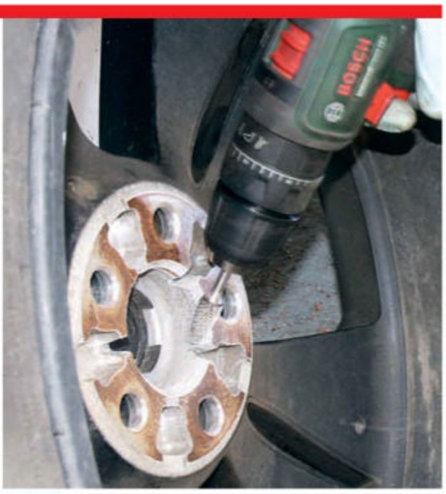
35 MEASURE DISCS

Use a digital Vernier or Vernier caliper to measure the thickness of the brake discs. The front discs should be a minimum of 30mm, whereas the rears need to be more than 18mm. Visually inspect the discs for corrosion and fractures.



36 CHECK PAD DEPTH

Measure the depth of the friction material on each brake pad using a brake pad thickness gauge. The MOT test states a minimum of 1.5mm, and all the pads across an axle must be replaced if one or more of them is worn beyond the limit.



37 CLEAN WHEELS

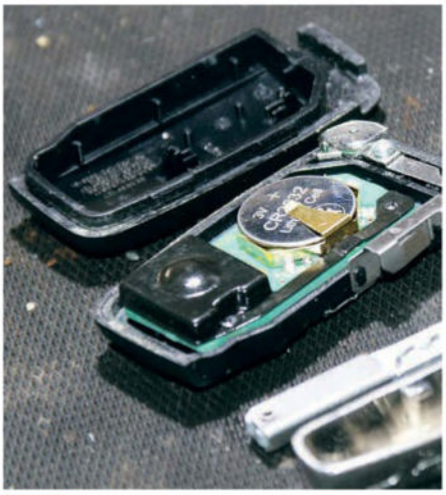
Before refitting the road wheels, use a wire brush or wire wheel attached to a drill to clean inside each wheel where it sits against the hub. This area can corrode, making it difficult to remove the wheel, so remove any aluminium oxide from here (wear a breathing mask).

38 REFIT WHEELS

Apply a smear of copper grease to the wheel hubs (around the studs for the wheel nuts) to help prevent the wheels sticking to them in the future. Refit the road wheels, lower the vehicle to the ground and tighten the wheel nuts to 4Nm, 70Nm and finally 133Nm.

39 CHECK TYRES & PRESSURES

Inspect the tyres for cracks in the sidewalls and uneven wear across the tread. Find the tread wear indicators between the tread blocks to see if the tread has worn down to these (replace the tyre if so). Check the tyre pressures – look in the handbook for the recommended pressure, or a label secured to the B-post.



40 CHANGE KEY FOB BATTERY

T&L recommends replacing the CR2032 battery inside each key fob at every service interval. They have experienced problems with key fobs if the battery goes flat, so they wisely renew them at every service.

SERVICE SCHEDULE

EVERY 16,000 MILES or 12 MONTHS

- Change engine oil & oil filter
- Change cabin filter
- Check coolant level & test concentration
- Check tyre condition, pressure & tread
- Top up screenwash fluid
- Check battery
- Check wiper blades & washer jets
- Check all underbonnet components & hoses for fluid leaks
- Inspect brakes
- Check steering & suspension components
- Check auxiliary drive belt
- Inspect exhaust system & mountings
- Check operation of all electrical systems
- Lubricate all locks & hinges

EVERY 32,000 MILES or 24 MONTHS

- Replace air filter
- Replace fuel filter

EVERY 36 MONTHS

- Change brake fluid

EVERY 72 MONTHS

- Change brake flexi-hoses

EVERY 112,000 MILES or 84 MONTHS

- Replace timing belt assembly
- Replace drive belt for high-pressure fuel pump

EVERY 144,000 MILES or 108 MONTHS

- Replace auxiliary drive belt(s)

EVERY 160,000 MILES or 120 MONTHS

- Replenish engine coolant
- Change automatic gearbox oil & filter

Don't forget to also

- **INSPECT FUEL FILLER CAP SEAL** for perishing and replace it if it's split.
- **INSPECT ALL WIPER BLADES** for splits and cracks in the rubber.
- **CHECK THE BATTERY** inside the boot and look for water ingress.
- Lubricate **LOCKS AND HINGES**.
- **CHECK FOR FAULT CODES** via the OBDII port (under the driver's side of the dashboard).

Help!

Your *non-diagnostic* vehicle-related problems solved by **Steve Rothwell**

FORD FOCUS

Engine mounts

Q Recently on my Ford Focus Mk2 1.6 TDCi I have suspected an engine mount needed changing based on the noise. I ended up replacing all three for a set that I had from a much lower mileage C-MAX that I stripped for spares – they were in noticeably better condition and did improve matters to some degree.

However, I now notice a tingling light vibration throughout my feet from the floor pan and accelerator pedal. It's there when pulling in gear and I tried coasting in neutral with raised revs and could still feel it.

I'm now wondering if it could be very early symptoms of the dual mass flywheel needing replacing. There aren't any heavy noises yet, the car has covered 168,000 miles so I guess it wouldn't be surprising if it does need renewing. What are your thoughts?

Dean Savage

A You will appreciate that it is difficult to diagnose a noise without hearing, and so I'm going on your explanation, hopefully giving you some areas to check. The DMF will often give a tinkling type of metallic sound, but this when occurring can normally be heard when stationary and in neutral by giving the throttle a quick blip. When driving, a failing DMF often has a heavier clonk type sound that can be heard during acceleration and deceleration.

The problem may though be the clutch centre plate as this can fail and may have cracked allowing unwanted movement, within the plate.

Once driving at a steady speed, the DMF remains under load and so does not normally create any sound. Although I add the word normally as in the motor trade, there is always the exception.

One area that is a common reason for a light tinkling rattle on your Focus TDCi is the turbocharger and this can occur due to sludge built up in the oil supply feed pipe, and so this would be worth checking.

The problem may also be related to the exhaust position, and I have seen a small contact area between the exhaust and body be the cause of such noises.

Finally, consider that the noise may not be drivetrain related and is a loose component under the vehicle which is rattling in response to movement.

FORD FIESTA

Heated windscreen

Q Could you help with a non-working heated windscreen on my 2005 Ford Fiesta? I have tested the electric side from the fusebox to the connections on the A-pillars for both sides of the screen. I am seeing 14.3 volts at the A-post connections with the engine running but still the windscreen does not heat up. I have run a continuity check from the battery earth terminal back to the earths on the A-pillars and all is well. My thoughts are the connections from the ribbon wire that connect to the windscreen are broken at some point though they both appear to be intact.

Thanks in advance.

Gary Coles

A The ribbon wire at the front of the screen as it enters the A-post is a common failure point, and having tested the connection to that point, then next you should check the terminals behind the A-pillar trims for damage, the 10mm bolt holding the earth terminal at the top, should also be checked, the fault is commonly caused by the blade connector at the bottom coming away from the terminal.

If the connections do all appear good then you should check the continuity through the screen, ensuring that this is not open circuit, indicating a break of the element within the screen.

FORD MONDEO

Tyre concern

Q My 2006 Mondeo is proving to be fine but when I checked the tyre pressure on the spare wheel it seems that the spare is the original and had never been used. It is the same size as all the other wheels, ie. 205/55/16, on a full-size steel wheel with a Hankook Ventus Prime tyre.

It had only about 11psi when I checked it but more important it was dated 39/05. It looked as if it had never been out of the boot. I understand that a tyre this old should not be used, can you clarify this and if it should not be used how do I dispose of it. I would worry that some unscrupulous tyre dealer would sell it on as a new tyre which strictly speaking it is. Or would it be safe to use in an emergency.

PS – there is an 80kph sticker on the tyre, but the wheel looks to me like a standard wheel. Your advice gratefully received.

Geoff Allen

A As you say the tyre is now well past the ten-year mark and I would not recommend using it as a replacement on any of the road wheels, but as a spare it would be OK, providing if you did need to use it you were fully aware that as the tyre is old the vehicle speed should be reduced.

I suspect that the sticker has been put on to ensure that the tyre can legally remain in the spare wheel position, and to ensure that it is not positioned on the vehicle.

If you did want to have a new tyre fitted, I would simply slice the sidewall with a sharp knife or drill a hole through the sidewall. This would consign it to the scrap heap and ensure it was not re-used. The tyre company replacing the tyre, would then dispose of it in the same manner as all the old used tyres they remove, and you could be happy that the tyre would not be put back into service.

I would though say that as you are aware of the situation, and if the tyre can be re-inflated and retain pressure, then at this stage it would be perfectly acceptable to use as a spare in an emergency, and of course better than many vehicles that now do not carry a spare.

FORD FIESTA

Belt-in-oil

Q One of the cars I maintain is a Ford Fiesta 1.0 EcoBoost, which as you know has a belt-in-oil arrangement. The car is meticulously maintained and is running faultlessly at 58,000 miles.

A work colleague recently had her Peugeot belt-in-oil snap and is being supplied with a new engine under warranty at 60,000 and this causing me some concern as she had no prior warning.

I have contacted a number of oil analysis companies who either didn't reply or gave non-committal answers when asked if they could advise me if the Ford cambelt was degrading prematurely.

In your experience, do you know of an easy way to periodically check for belt-in-oil, belt degradation? Can a borescope be used, for example?

It is likely that I will renew the belt and related items earlier than Ford recommend, but I'm wishing to know the belt's condition in the meantime.

Many thanks in advance.

Bruce Selby

FORD FIESTA

Brake discs

Q I carried out a basic service on my Fiesta last weekend and I hope you can offer me advice on two subjects. My car is a 2012 Ford Fiesta 1.4 Petrol Automatic with 44,000 miles (owned my myself from three months old and with 300 miles). The front brake discs and pads are original. I started servicing the car myself from 2017, before that local Ford dealer every year from 2013-2016.

I service the brakes every year and noticed that when I first did them in 2017 the front discs did not separate from the hub when I removed the pads. Intrigued, I explored further and concluded that from the factory there was probably no anti-seize compound applied to the hub surface and now the discs are seized/corroded to the hub. I put this thought to the back of mind to only worry about when the time can to changing them.

Seven years later and I am now considering changing the discs and pads and have been researching methods to remove seized-on discs and would appreciate your views and methods.

I've copied in a link below to a method suggested to someone with an earlier model Fiesta (it should highlight the exact comment) suggesting using the turning force of an idling engine with the road wheels removed and gently applying the brakes to break that corrosion bond with the few millimetres of play between wheel studs and the disc stud holes.

"*Ford fiesta brake disc stuck! I have an N-reg Fiesta Mk3 and am in the middle of changing the front discs and pads. I've jacked up the car, taken off the wheels, but one of the brake discs is completely stuck to the hub! After many attempts to gently persuade it off, I resorted to a bit of brute force with a mallet but all to no avail, the thing just won't come off.*

I suspect the car has been in an accident before me owning it, and that there are still parts of the car that are just a bit bent out of shape. The only thing I can think of is to remove the hub and bearing and change the whole lot. Is there an alternative to this or does anyone know if this can be done with the disc still in place? Please help... Graham

The reply "*Put your hammers away unless you want to destroy the wheel bearings by Brinelling. Remove all disc fixings, jack up front of car completely, run engine in first gear at idle, then gently apply the brakes. The first disc will break free with a crack – stop everything and replace 2-wheel bolts on this side. Now repeat to free the other side.*"

I could also attempt some penetrating oil the day before to spray in from the back of the disc, so it penetrates the mating surfaces.

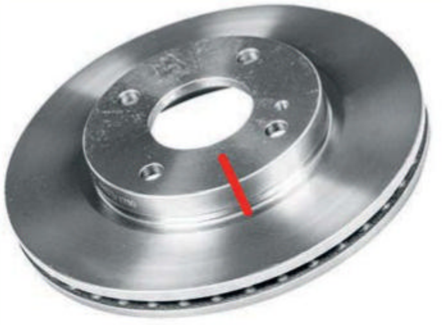
The other option I considered was using the mounting holes from the removed brake calliper carrier to thread a bolt, washer and nut through and keep turning the bolt to push against the disc enough to hopefully break that corrosion bond and release the disc.

I'd rather not hammer away and cause shock damage to other components and I don't own a blow torch but could purchase one if needed.

My other question is regarding the automatic transmission fluid. What are your thoughts on changing the fluid? It is supposed to last the life of the transmission but that depends on how long they consider life to be! The AT in my Fiesta is the traditional torque converter type, not the automated manual they brought out shortly afterwards.

As always, thank you for help.

Trevor Nicholson



If the brake disc is cut in the area of the red mark with a grinder this will help an easy removal.

A The suggestion you have linked to on the Forum is imaginative but not one I would use or recommend – it is also one that I would not see as being effective on a brake disc that was badly corroded in place. The risk in this method is that if the brake disc does partially break free, it may then throw out and cause damage to the caliper or another component.

Whilst using heat may be an effective method, this would also come with its disadvantages, and may cause damage to the grease in the bearing.

My preferred method is to use an angle grinder to cut a slot in the brake disc at the area of the flange (as marked on the attached picture), being careful to not cut through the brake disc and into the flange, and then a firm strike with a hammer will normally free the disc without excessive force.

The combination of the localised heat developed when cutting the slot and the now weaker area of the brake disc will cause the brake disc to expand and will normally be all that is needed to break the joint caused by the corrosion.

Soaking the area between the brake disc and the hub the night before, may be sufficient.

The transmission fluid is considered by Ford as filled-for-life, and a drain plug may not be fitted, but I would consider that at around 50,000 miles and given the age of the oil, that it would be worthwhile changing the oil. This can be done by disconnecting the oil cooler return hose and draining the fluid from this point.

Then by starting the engine and allowing it to idle, it will begin to pump out the transmission fluid. Pump out around three litres of transmission fluid and then turn the engine off. If less than 1 litre of fluid is pumped out at this stage, it may indicate a restriction in the oil cooler or lines.

The transmission should then be filled with three litres of new fluid and the process repeated twice. After which the oil cooler hose should be reattached, and the level checked. The level will then need checking again when the transmission fluid reaches 50-60°C (running temperature).

The recommended transmission fluid is Ford WSS-M2C938-A.

A The timing belt can be viewed by removing the cam cover, and this really is the best way to get a decent look at the belt – any deterioration of the belt will then be seen quite clearly. If there is any deterioration of the belt – the back face of the belt will have an uneven surface – this should be quite noticeable.

As you have probably seen, the timing belt replacement is quite a big job and has a book time of seven hours.

I would add that when the belt does begin to deteriorate, this will also deposit black debris in the oil which would also be noticeable during the regular oil changes. I would suspect that an oil analysis should detect the foreign partials and I am surprised at the replies you have had from the oil analysis companies. This would be one of the reasons that such tests were carried out.

I would also add that if the belt does degrade, and deposits are found in the oil, then the oil pump strainer should also be cleaned as a matter of course. One other point is that the belt-in-oil is another reason to ensure that the correct engine oil is used to prevent such problems.

JAGUAR F-PACE

Dipped beam fault

Q I have a problem with my 2017 Jaguar F-PACE 3.0 S. The vehicle is fitted with LED lighting and a 'dipped beam fault' message has appeared on the dash. There is a code B1D64 'motor operation failure of left actuator' present which can be cleared but returns every time the headlights are switched on. Other codes found in the body control module are 'U2300 central configuration' and 'U0055 vehicle communication bus D'.

These last two codes can be cleared and stay off for a while but eventually return. I have tried a known good headlight in the affected side, but the fault persists. I also note that there is no voltage at fuse No1 – 'left side headlight motor' although the fuse is good. The dip and main beam seem to work fine, and it seems only the corner assist function is absent.

I have checked as far as I can for physical damage to explain the missing current without success. Perhaps I have a module failure or a software issue? The car is due the MOT test soon and wonder if it would fail with this fault present?

I usually use main dealer servicing which is not due for some time and would hope that I could continue to use the car until I can get it to the dealer if it turns out that is what is required. Hoping you can advise.

Victor Stevenson

A As you have swapped the headlamp out, this should eliminate the possibility that the problem is within the headlamp. If this thought is coupled with the other two codes – U2300 invalid/incompatible configuration, and U0055 Vehicle Area Network (VAN) data bus D – this does appear to be a software issue or a communication problem. The code B1D64 does refer to the swivel/adjuster motor and if this is not operating then the corner assist function would not operate.

The headlamp adjust motors are both fed from fuse 2 in the engine bay fusebox, and the lack of voltage at number 1 fuse (the left-hand headlamp control) is strange.

I did find a Technical Service Bulletin (LTB00173) from 2008 referring to the same problem on Land Rover and in this case the fault was rectified by a reprogramming of the control module. I suspect that given the steps you have already taken this will be the case with your 2017 Jaguar.

The MOT requirement on LED lighting is that if the vehicle is fitted with a suspension or headlamp self-levelling system, this must work. It is this element of the test that may cause the problem.

As I would not expect major problems within the wiring loom at this age, I do suspect that this may be a software or configuration problem, and I would suggest that main deal level Integrated Diagnostic Software will be needed to confirm and hopefully rectify this fault.

JAGUAR XJ

Oil level sensor

Q I have just done an oil change on my 2016 Jaguar XJ 3.0 diesel. The problem I have is the oil level display keeps saying oil level not available. I have checked it from cold and had it warm left for 10 mins but still the same. Do you think it might be the sensor at fault in the sump? Or am I doing something wrong?

Also is the service indicator easily reset?

Mark Deane

The oil level sensors are notorious to be slow to return to full operation after the oil has been drained down.

This is something I have experienced many times, and not just with the Jaguar sensors. When the oil is drained down, it can then take a while for the oil to surround the sensor correctly again to allow it to give a reading.

Provided you have put the correct 6.6 litres of oil in the system, then I would be happy the level is correct. After a run, the engine will need to be turned off for at least 10 minutes before the system will register after 10 minutes the level normally accessed by turning on the ignition and pressing the OK button on the steering wheel to access the menu, then the 'average', and to access the live reading, the below instructions need to be followed:

Once the menu is accessed then the control around the OK button should be pressed until "oil level display" is shown. Then the OK button should be pressed, followed by the cruise control cancel button which should be depressed twice within two seconds. By then repeating the process, pressing the menu select button and selecting oil level display, this will show the live reading as opposed to the average reading that is otherwise shown.

You can then press and hold cruise control 'CAN' (cancel) button for more than two seconds to exit live oil level reading, and the ignition can be turned off.

If this process still does not show the oil level, then the sensor may be faulty, but I would give it time before condemning the sensor, as this may well operate after a normal cycle.

The service indicator reset changed in 2014, up to that point the system could only be reset using diagnostic equipment, but the 2014-onward models can be reset as follows:

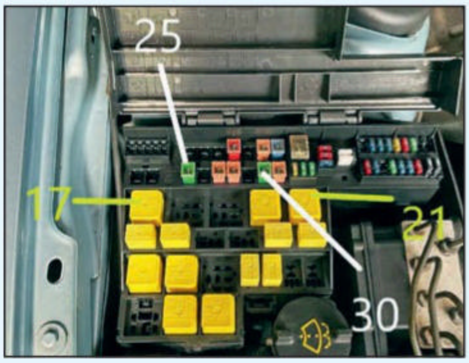
- **Switch the ignition on and open the bonnet and the driver's door. Press and hold the brake and accelerator pedals fully depressed for 10 seconds. At this point the service reset message will appear in the display.**
- **Then release the pedals and switch the ignition off. Then switch the ignition on and check that the service interval indicator or service reset message is extinguished. If not, repeat procedure.**
- **Switch ignition off.**

JAGUAR S-TYPE

Windscreen fuse

Q I have a 2002 facelift Jaguar S-TYPE 3.0. I am currently trying to locate the fuse (and relay) position for the heated front windscreen but as they are all marked merely with numbers, I am at a loss as to where I should be looking. Can help at all? Many thanks in advance.

Phillip Claridge



A The circuits for the windscreen are separated for the left and right sides. The fuse for the left side is number 25 and for the right side is number 30.

The relays are number 17 for the left side and 21 for the right side. The fuses and the relays are located in the fusebox found in the offside front of the engine bay.

VAUXHALL MERIVA

Fault code 4

Q My wife drives a 2013 Meriva B with the naturally-aspirated 1.4 petrol engine. Earlier this year it had several minor coolant leaks, the expansion bottle was cracked, the coolant elbow on the side of the head and a small breather connecting the two were all replaced, and it was topped up with the correct coolant.

It has behaved itself until this afternoon when it has shown 'code 4'. This comes up as 'air-conditioning off' in the book but when investigating online, some people have found this relates to the coolant system and one video shows this coming up after replacing the coolant elbow.

She has reported that the coolant temperature was fine throughout her drive and the error went away after stopping the car, locking it and returning to it later.

Do you have any advice of where to best start investigating?

The relationship to the cooling system is the concerning part for me as if it was just an A/C fault we could potentially see how the fault develops. Thank you.

John Tyrell

A The code 4 displayed is indicating that the aircon is switched off. This can be done by the engine control module under different circumstances and as well as an A/C problem may be indicating a cooling system fault including the temperature sensor, thermostat, or the cooling fan operation.

I would check that the connections to the engine sensors and the cooling fan are in good order, but as the temperature gauge is reading normal then it would be less likely that a thermostat or engine coolant temperature sensor was at the heart of the problem.

I would keep an eye on the coolant level and ensure that the system does appear to be operating OK. If possible, it would be worth checking the live data using a diagnostic scanner to ensure that the readings from the sensors are correct and to ensure that no codes are present in the system.

As this code has cleared after switching off, I would at this point be happy to just keep an eye on things at the moment and would not expect this to develop into a serious cooling fault at this point.

I then received a reply from John

Following on from this the engine overheated after around eight miles and once it was in stop-start traffic. When I got to look at it, it seems that the cooling fan has failed.

The plug on the fan was getting a live and an earth but the fan was not trying to spin at all – it would turn without any resistance. I have ordered a new fan. Are there any further checks you would recommend?

Also, does the fan replacement involve removal of the front bumper to remove the radiator and then dismantling from there?

John Tyrell

The display of the code 4 would have been due to the A/C being turned off by the engine control unit due to the failure of the cooling fan.

The details I have do show that the front bumper and radiator will need to be removed to replace the cooling fan. The complete job is given a book time of 1.2 hours and so this should be quite a straightforward task.

Once the fan is removed and the radiator replaced and the cooling system bled out, I would expect this to rectify the issue.

VAUXHALL ASTRA

Aircon illumination

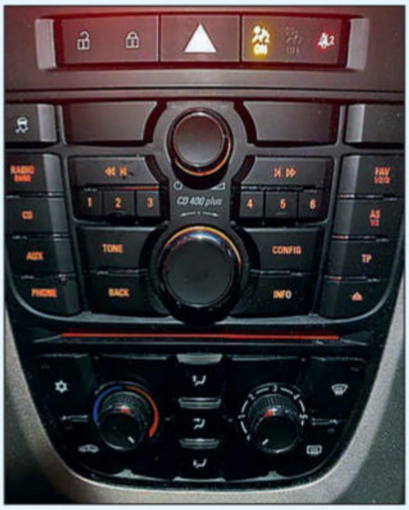
Q My son-in-law mentioned at a recent family gathering that some of the centre column lights on his Astra had stopped working so I said I would take a look. He was worried as he couldn't see the controls on the panel in the dark. I got him to send a picture of the centre panel in the dark with the lights on and I can see what he means (photo attached).

I'm not really into Vauxhalls, my last involvement was my first car, a Chevette. I loved it really, but you got to know about cars or walked. It was seven years old (in 1983) and was rusting quicker than you could stop it. Thus, no more Vauxhalls.

Anyway, it looks to me as though the aircon, etc., panel is goosed. It works but without lights it not really that safe – eBay seems to have a lot of them for sale.

Your wise opinion would be appreciated.

Arnold Holmes



A The illumination of the panel is via LED bulbs that are not designed to be changed. The option of getting a replacement panel as you mention would be the easiest option and these are around £20-£30.

I would, though, if replacing the panel, have a look at dismantling the old unit, and once the back is prised off, you may be able to see a method or repair, I have done this with various switch packs and units over the years, and some can have the bulbs replaced even though not designed to.

VAUXHALL ASTRA

Exhaust advice

Q I have carried out an oil change on my Astra and noticed that the DPF flange that joins the exhaust pipe is getting very rusty. Just wondering if there is anything I could paint on or wrap around to protect with the high temperatures that the DPF can generate?

Also, what would you use to lubricate the brake caliper pins? They seemed very stiff when I took them out. I did spray some silicone on but is there anything else you could recommend?

Ian Browning

A As you mention the exhaust flange does reach very high temperatures, and any paint used would have to withstand temperatures that can reach 650°C.

Most engine paints that are available and marked as high temperature paints are normally OK up to around 500°C, and so may not do the job. Also, as the flange is already heavily corroded, this may not provide any protection. As this is quite normal, the only action I would take is to cover the flange stud threads with a high melting point copper grease. The grease element of the copper grease will burn away under the temperatures reached, but the copper coating will remain – this should assist in ensuring that when the time comes to replace the exhaust the nuts may be a little easier to remove.

If you did want to paint the flange, then it would need cleaning back to good metal and the flaky rust removed. After this, a paint such as POR15 High Temp Paint available from frost.co.uk could be used.

The brake pins can be lubricated with CeraTec Brake Lube – this will resist the effects of heat that is present in the brake calipers during brake operation and will continue to offer a high level of lubrication.

⇨

AUDI A6

Lack of oomph

Q I bought my 2010 Audi A6 170 TDI 2.0 Le Mans from a dealer in October 2019, two weeks later the head gasket went – six weeks later got the car back. The car starts first time every time and runs really well. It returns 41mpg measured tank-to-tank. I try to keep up on maintenance and the oil and filter have been changed three times in the last seven months (that's another story). Air filter was changed about 10 months ago and was recently checked to make sure everything was still clean.

I have changed plenty of fuel filters in my time but decided to get it done a couple of months ago by my local Audi specialist using genuine parts, as I have read horror stories about not priming the system properly and running the pump dry. So what's the problem?

I just feel like it doesn't have the oomph a 170bhp car should have and it has been nagging me for quite a while. To this end I put it on a rolling road and to my horror (but not a complete surprise) it is only producing 148bhp at the flywheel. So, 20 gee gees have gone AWOL, not to mention some torque.

A little while ago I did a scan using VCDS and it said number 4 glow plug was kaput, so I decided to change all of them. Whilst I had them out, I tried to do a compression test but none of the adaptors seemingly wanted to screw into the head and being scared of cross-threading decided to not push my luck.

The Draper kit lists the adaptors as follows:
M10 x 1.25 - M10 x 1.0 - M12 x 1.25 - M14 x 1.25

The application list says they are suitable for VW (amongst others) but not specifically for Audi. Does any of your magic books list the thread and pitch I need (I can get spare adaptors from eBay). I have Googled it but got various answers (the most popular being M10 x 1.0). If you confirm that is the size, I will be a bit bolder and have another go – maybe coat it with Copaslip to help things along.

I have attached a scan which also shows the fuel pressure reading at the bottom. I note Address 02 shows there was a lack of communication with the ABS module (I have tried to clear it but to no avail). The date is logged as 23rd June and this is the day the car was on the rolling road, so I presume they disconnected the wiring for some reason.

Thinking outside the box (if you could call it that) I wonder if they used the correct thickness gasket when doing the head?

Dave Spinks

The Draper compression tester kit which incorporates the adaptors for the diesel engine.

A The glow plug recess thread size is not specified in the Audi manual, but by checking the recommended glow plugs and then reading off the specification I can confirm that the glow plug thread for your engine (CAHA) is M10 x 1.0.

It is possible that a slightly thicker head gasket has been fitted, and this is normally done to compensate for a skimmed cylinder-head. The thickness can be checked by the number of notches to the back right-hand corner of the cylinder-head. This is difficult to see with the cylinder-head in place, one notch = 1.55mm and three notches = 1.7mm, although the small amount should not really cause a vast difference to the compression and power output.

If for the moment we discount a compression problem, and consider the other options, one that springs to mind is that the valve timing maybe set incorrectly. As the camshaft and fuel pump pulleys are fully adjustable and can be tightened into position at any point within the arc of the slot. It is possible that when the cylinder-head was replaced, the timing was set fractionally off. With the method of adjustment used on this engine, this would not need to be a tooth out but could equate to around half a tooth.

In this situation the engine would run smoothly and economically as it does, but may lack the slight oomph.

Another consideration is that the variable vanes on the turbo are not fully functional, but this does normally result in a fault code for over- or under-boost, and so this is less likely.

Finally, the MAF sensor. This is something which can have the effect of reducing engine power and give no other symptoms. The hotwire element does change resistance over time, and whilst not making a noticeable difference during normal driving, and ageing MAF sensor can affect the vehicle performance and output.

AUDI A4

Non-start

Q I have what I feel is an unusual query. The vehicle in question is a 2008 Audi A4 TDI which has covered in the region of 180,000 miles. Recently the car was involved in a minor collision, while travelling at about 25 miles per hour – it had what we describe as a soft landing in that it came to a stop in a soft boggy drain. The body damage is only cosmetic.

However, since the minor soft impact the car will not start. It is one of those where you push in the key fob into the slot to start it. There is full battery power coming to the fuses. It was running perfectly prior to the minor collision. The dash is showing the following message, 'Ignition lock defective, contact workshop'.

As you will appreciate due to the age of the vehicle, and its low commercial value, it is not worth taking it to an Audi dealer for diagnosis/repair. Have you ever come across this message before? If so can you say what it means in layman's terms, and can the car be brought back to life? If we fit a new/used ignition switch and key fob will they have to be programmed to the car?

Michael Carty

A The message ignition lock defective is normally associated with a failure for the electronic ignition lock mechanism to activate either on or off. This can occur for a couple of different reasons which may be to do with the signal from the key fob or the fob receiver. It can even occur if the key is not sliding correctly into the receiver due to dirt, and so ensuring all is clean before proceeding would be a good idea. The message is saying that the key fob and steering lock/ignition are not communicating.

The steering lock mechanism itself can also fail and is another point to check. I would check the connections to the lock mechanism to ensure nothing got disturbed.

As the collision did have a soft landing and the airbags were not deployed, I would not expect the problem to be related to the incident – but it would be worth using a code reader which can access all systems to ensure no codes are in the ECU.

The lock mechanism on the Audi can be easily upset and I have heard of problems from owners after the vehicle has been through an MOT, which had apparently caused the problem to occur.

With this in mind, the collision although having a soft landing, may well have caused a pending fault to come to the surface. Hopefully a system scan will indicate the exact area of the problem.

SEAT MII

Coolant queries

Q My wife runs a 2013 SEAT Mii. We bought it new in 2013. It is used almost exclusively for local journeys and at 10-years-old it is due a coolant change. Current mileage is about 28,000. I have maintained it myself after the second dealer service and it has no faults. It is of course mechanically identical to the VW Up! and Skoda Citigo. I have a number of questions:

1) I noted the item in Rob Marshall's Cooling article – *CM* Feb 2023 – where one can check the coolant corrosion additive efficiency with a multimeter/voltmeter by earthing the -ve terminal on the engine or a metal coolant pipe and dangling the +ve terminal in the coolant header tank, looking for a voltage reading less than 0.4 volts. My question is, how does this work? Where does EMF in the coolant relative to the engine come from? I tried it with the Mii and obtained a reading of about minus 1 volt, which makes no sense at all.

2) The workshop manual for the Mii says that it is filled with G13 coolant from the factory – however this is purple. The owner's manual says it comes with G12++ or G12+. Other sources say the coolant should be G12++. The owner's manual says that G12+ and G12++ are purple, but they look pretty much pink to me. My coolant is pink, so I assume it is in fact G12++ or G12+. The workshop manual says not to mix G13 with G12++ or any of the other G12/G11 variants. Other sources say that G13 mixes well with the G12 variants. So which coolant should I use – G13 or G12++?

3) Coolant refill procedure. The workshop manual says refill the cooling system to the max mark on the expansion tank then apply 1.5 Bar pressure using a special adapter cap to the expansion tank and an air pump, before going on to do the usual bleeding operations. I have never applied pressure at this stage to a cooling system despite having done countless coolant changes on various vehicles over many years. What does applying this pressure do? Does it matter? The Mii has no bleed valves but in that case, I have always just disconnected hoses high up on the engine to help expel air.

Many thanks for your very helpful content in *CM*.

John Cookson

A The electrical testing works by showing up the acidity and conductivity of the coolant, because the system can act like a battery and internal electrolysis can create a voltage due to the chemical elements within the fluid being surrounded by the metal of the coolant jacket.

The -1 reading you obtained may be an indication of a reversed polarity action within the system and I would repeat the test with the meter terminals reversed to ensure that this is not the case, but it may simply be an error within the meter.

The details I have are that your Mii should have G13 coolant. This is purely an improved version of the G12+ and G12++. The G13 can be mixed with the G12++ and it is noted that the coolant when mixed may turn brown, but this is an acceptable situation. I believe the reason that it is recommended not to mix these is that the G12+, G12++ and G13 are lifetime coolants. And as such when over 20% of the coolant needs to be replaced the complete system should be drained and refilled.

As you have seen, the workshop manual does advise that the system should be topped-up to the maximum mark and then 1.5 Bar of pressure should be applied. This is to effectively allow any air to be forced from the system, and to disperse any air pockets that may have formed. By by-passing this step, the worst case scenario is that the system may have an air pocket which allows local boiling of the coolant. To ensure this is not the case I would add the following step to the bleed process – this would be to fill the system and then run the engine with the expansion cap off at around 1800rpm for around five to ten minutes. This should allow any air in the system to shift freely and escape.

Then the next stages as noted in the manual can be followed – this is to top-up the system and fit the expansion tank cap, after which the engine should be run at 3800rpm until the fan kicks in. Then the engine should be switched off and the coolant level checked. I would expect this to bleed the system satisfactorily under most circumstances.

SEAT IBIZA

Oil change noise

Q I have a 2008 SEAT Ibiza 1.2 petrol 3-cylinder engine with timing chain. This car is serviced every year or at intervals of 10,000 miles, whatever comes up first, according to the last owner and service records. The car currently has 76,265 miles on the clock and runs very well, there is no timing chain noise when the engine is up and running and at idle. I have owned this car now for a year and a half, but used daily up until a few months ago, so only noticed this change now.

I use the recommended type and grade of engine oil, however I have noticed that if I leave the car untouched for a couple of days, when I first start the engine, it make the same noise as if I have just changed the oil and filter! When used every day this does not happen.

Is this due to the drain back system? Should I replace the other two small rubber seals on the oil filter holder (Black plastic thing that paper type filter is pushed onto) the large diameter O-ring is renewed each time with the new filter, but other seals are not included with the new filter.

Is this noise normal? Any advice on this matter would be fully appreciated.

Terry Jordan

A The noise does sound to be that which would be heard before the oil gets up to pressure. Autodata does inform me that your SEAT can suffer from a knocking noise from engine compartment when starting or stopping the engine. This is caused by the air filter housing knocking against rear locating pin. The remedy for this is to reduce the length of the locating pin by 4mm, but I do not believe that this is the problem in your case.

As you have mentioned I believe that the oil may be draining out of the oil filter when left standing for a while, and this is probably due to the oil seeping past the two small lower seals which are placed on the end of the oil filter holder.

These seals are normally supplied with the genuine filter, and often also with aftermarket filters, and should be replaced along with the oil filter and top seal ring. Hopefully by replacing these small round O-rings, the oil will no longer drain from the filter housing and the noise will be eliminated.

SKODA FABIA

Camshaft chain rattle

Q I just recently discovered your magazine while travelling and it is just what I had been looking for some time. So, I signed-up for a subscription. I do have the following question(s) though: Have you ever done an article about the cam chain problems of the VAG petrol 1.2 TSI 86PS OHC, built in 2011, and if so in which edition? I believe the 1.4 was also affected. The problem was caused (to the best of my knowledge) by insufficient quality of a number of cam chains which VAG got from a manufacturer – which lead to premature wear.

More specific: we have a Skoda Fabia from 2011 with the said engine (has now about 55tkm on it). It developed the typical noise of cam chain rattle at around 10tkm, and the main dealer replaced chain, sprocket, chain tensioner, rails and some minor bits. Over time the rattling noise came back, but not at every start. Sometimes the engine starts smooth and quiet, sometimes its rattling for a second or two. I had the dealer measure the chain for wear some time ago and was told it was fine. I told them to replace the chain tensioner, but that did not change anything.

I found, mentioned somewhere, that there is a non-return valve (underneath the oil filter?) which might not always close completely and allow oil to drain back to the sump and take one second or so to re-pressurise the cam chain tensioner at next start. Can that be true, and if so, can this valve be identified (part number) and changed?

Is there anything I should do to prevent engine failure or is the occasional rattle nothing to worry about? The main dealer is not of much help unfortunately.

Thank you so much in advance. Kindest regards from Norway.

Jørg Gottwald

A We have not specifically covered the 1.2 VAG cam-chain problems, but did do a general article which was printed in the October 2015 edition on *Timing Chains*.

Interestingly enough the dealer bulletin on the 2011 VAG 1.2 TSI engine recommended fitting a timing chain kit part number 03F 198 158 to alleviate the problem, but after further research I have discovered that this timing chain kit was susceptible to elongation and a newer repair kit was released part number 03F 198 229A. This included a reinforced chain (part number 03F 109 158K) and a new chain guard with anti-jump teeth part number 03F 109 210D.

It was noted that even after the fitting of this kit rattling may still be heard due to weakening of the tensioner spring.

I can though find no details of a one-way valve fitted into the oil system and the only such valve is within the oil filter which will of course be replaced during a regular service.

Interestingly enough, though, this is one of the modifications carried out by Mercedes to eliminate initial timing chain rattle with the valves being fitted behind the tensioners. This indicates that the problem is something suffered by different engine manufacturers using timing chains.

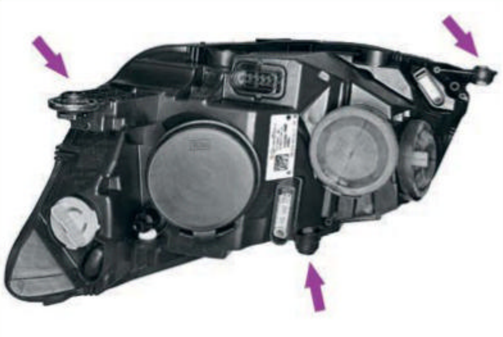
The best way to prevent engine failure is always to ensure a good quality oil is used and renewed – along with the filter – at regular intervals.

SKODA FABIA

Headlamp removal

Q My son has bumped his 2012 Fabia 2 1.6 TDI. The nearside headlamp is smashed. It looks like we have got away with undamaged fittings, and I am hoping you can describe to me the removal of old and fitting of replacement procedure. As always, your time is much appreciated.

Andy Scholey



The Skoda headlamp showing the three fixing points.

A The process of removing the headlamp is given a book time of 0.8 hours, but a further 0.9 hours must be added for the removal of the front bumper.

The process will begin with removing the front bumper and this is done as follows: the inner wheelarches should be loosened and then the two securing bolts can be located where the front bumper is connected to the front wing. Then from the inner wing area a further two bolts on each side securing the bumper should be removed.

There are then two removable rivets at the top of the bumper above the grille that can be accessed under the bonnet and a further two bolts, and then a further three bolts at either end under the corners of the bumper. Two bolts are also hidden behind the small grilles at the front of the bumper to the end of the main lower grille. Once these are removed the bumper can be removed, the fog lamp and parking sensor wires if fitted will need to be disconnected. I will mention at this stage that if just replacing one headlamp, I do normally only disconnect the one side and gently pull the bumper forward supporting it to save the need for the complete removal.

Once the bumper is removed or access is available to the lamp, there are only three screws securing it – one to the top, one to the inner edge at the front and the other accessed from the rear near the connecting plug.

Refitting is as they always say in reverse order, and it would be wise to also get the alignment checked after the job.

SKODA OCTAVIA

Road noise

Q I have a Skoda Octavia 1.5 TSI SE-L a 68-plate. It is a very good vehicle but it's the level of road noise that bothers me. I am not sure what I can do to help with this. The tyres fitted are Hankook 225/45 R17 with a 71dB rating. Perhaps fitting different tyres with a lower noise rating would help, but which tyres would be the best ones for my Skoda?

This will of course be expensive to replace all the new tyres, but I would be happy if there was a big improvement. Other than changing the tyres I am not sure what else I can do. I would be grateful for any advice you can offer me.

E Lewis

A Road noise is one of the points mentioned in a few of the road test reviews on the Octavia. The 17in tyres you have will create more noise than the 16in which appeared to be an option.

Looking at the various range of tyres available, the Yokohama Advan Fleva V701 appears to have the lowest noise rating at 67dB, but I would not like to suggest that it would be worth changing four new tyres for the difference you may hear.

Although the noise ratings are an indication of the emitted noise, there are other factors which will allow the noise to transmit into the vehicle. As mentioned, during some of the road tests carried out, the tester did remark on noise transmitted into the cabin.

If you are concerned about the noise and intend to keep the vehicle in the long term, it may be worth considering changing to 16in wheels as this would probably make the greatest difference to the emitted noise levels.

SKODA FABIA

Belt or chain

Q I have just bought a 2015 Skoda Fabia 1.2 TSI that has done 39,000 miles. I wondered if you could tell me whether it has a cambelt or chain. The reason I ask is because I am getting different answers from different people! If it is a cambelt when does it require changing. Really hope that you can help.

Graham Lingard

A The MkIII Fabia with the 1.2 TSI engine (codes CJZC or CJZD) 2015 onwards, has a timing belt which requires replacing at five-year intervals. There is no stipulated mileage but I would change it at a maximum of 60,000 miles.

The MkII Fabia 2007-2015 TSI engine (codes CBZA or CBZB) has a timing chain. This is possibly the reason for the different answers you are receiving, as a 2015 model Fabia could be a MkII or MkIII and the engine code will give the correct information.

SKODA ROOMSTER

Service reset

Q I have a 2015 Skoda Roomster Scout 1.2 TSI. Can you tell me how to reset the service and inspection warnings please?

Chris James

A There are two different variations that may apply to your vehicle, depending on whether it has the multifunction display with controls on the wiper stalk or not.

If you do not have the multifunction display the procedure is as follows:

- **With the ignition switched off, press and hold the right-hand button below the centre display on the dash panel. Keeping the button held in, turn on the ignition. Release the right-hand button and press and hold the left-hand button for around 20 seconds.**
- **The display should return to main menu indicating the service indicator is reset. The button can then be released, and the ignition switched off.**

From experience I can tell you that this may not work on the first attempt, and the time taken between releasing the right-hand button and depressing the left-hand button is crucial.

If you have the multifunction display with controls on the wiper stalk the process is as follows:

- **Switch the ignition on and press and hold the lower section of the button at the end of the wiper stalk for more than one second. The main menu should now be displayed. Repeatedly press the button until the 'Setup' is highlighted.**
- **Press the button on the base of the stalk briefly, then press the first button again until 'Service' is highlighted, then again press the button at the base of the stalk.**
- **Now press the first button repeatedly again until 'Reset' is highlighted, then press the button on the base to confirm. The service interval should now be reset and the ignition can be switched off.**

SKODA FABIA

Central locking

Q Please could you help me with the central locking problem on 2011 Skoda Fabia 1.2 HTP? The driver's door will not lock on the remote on both key fobs (new batteries in both). All the other doors lock. If the key is used it works fine.

Also, when you turn the ignition on the central door lock cycles and internal lock button doesn't work. I think it is the driver's lock. I have looked at replacements and have found a febi 179152 listed by factors but not on febi Partsfinder website.

Chris James

A I would certainly agree that the symptoms you have do indicate that the problem is the driver's door lock. The cycling of the central locking is a classic indication that the lock is trying to operate, but failing to position correctly.

As the central locking does operate when using the key, this confirms the problem, as by using the key you are manually putting the lock in the correct position.

The part number you have given febi 179152 appears to be for LHD vehicles, and so as this would not be the driver's door on a left-hand drive vehicle, may not operate correctly.

All the factors lock assemblies I can find are marked as LHD and so it may be worth checking the VAG part number on the old lock to cross reference this before making the purchase.

The VAG cross reference I have on the febi 179152 lock is 3D1 837 016 AE. If this number concurs with that on the lock, then the febi replacement will fit.

SKODA FABIA

Spark plug change

Q In 2015 I purchased a new Skoda Fabia III 1.2 M6F Turbo. I have been back to the dealer annually since then for servicing. Recently it went in for its 10,000-mile service. I was told that as it had now done 10,000 miles it should include a change of spark plugs, which would cost £140. Really! Glad it's not a V8. I declined and said 'next time'. I thought that I would think about buying the plugs online and fitting them myself, but on lifting the bonnet all I could see was a huge jumble of plastic pipes and fittings and wondered how to get to them.

The engine runs great and returns over 50mpg at a constant 60-65mph. May I please have your thoughts on the necessity of changing the plugs every 10,000 miles, and would you care to comment on the plug change cost?

David Wood

A The replacement period I have for the spark plugs is four years or 40,000 miles and the total time allowed for the four-year service, including the replacement of the spark plugs, is 0.9 hours. So, the £140 extra you have been quoted does sound rather high.

From the data I have on your Skoda, the spark plugs fitted are Bosch Y5 KPP 332 GA. This is a double platinum spark plug and should easily give 40,000 miles of service, I would not change them before that mileage.

The spark plugs on your engine are at the rear of the engine towards the bulkhead, under the coil packs which will need to be unbolted and lifted out of the way. When fitting new spark plugs the torque setting is 22Nm

It may be time to find a good local independent garage who can care for your vehicle without the high charges. If you can find a garage close to you which is listed in our *Good Garage Guide*, I would try them. They are garages that have been recommended by other readers, and from the visits I have made so far, they live up to the recommendation.

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VOLKSWAGEN GOLF

Bleeding brakes

Q I have just replaced the front and rear brake pads on my daughter's 2012 VW Golf 1.6 TDI and have decided to also change the brake fluid due to the age of the car. I have been to a few online forums to ask about using VAG-COM.

I have performed a few brake fluid changes with my wife pumping the pedal and topping up the brake fluid as we bleed each corner. My rule of thumb has always been to work the furthest away from the reservoir, but have heard that this is not the case for this car.

I am looking for the correct process and the order in which to renew and bleed the brake system, as well as how to use VAG-COM. Many people have done this job and correctly bled the system, only to find that the pedal was not as solid as before. I am now a bit unsure if I want to attempt this job. Do I need to have a pressure fluid kit or can it be done the old way by just topping up the fluid reservoir? My friend had said that if you have the car running when bleeding the system this helps the ABS so that the system pump will not draw air and help to bleed the ABS unit.

John Hynd

A There is often a worry on vehicles with ABS that problems are going to occur when bleeding out the brakes. This can occur, but only when work has been carried out which has allowed air into the braking system. When changing the brake fluid, as you are intending to do, no air should be introduced into the system.

The job can be done using the old method of having one person in the vehicle pumping the pedal, while a second with a tube attached into a vessel opens the bleed screw to allow the fluid out. Using a pressure bleed system such as the Gunson Eezibleed, which is presently around £19.99, will make the job easier and reduce the risk of problems such as air introduced via the brake master cylinder seals, which may travel further than normal during the bleeding process.

The order recommended by VW to bleed the brakes is: front left, front right, rear left and rear right. The rule of thumb is to always start with the bleed screw furthest away from the master cylinder, but the modern school of thought is to flush the new fluid through the shorter lines first – this gives less chance of any older fluid remaining in the system.

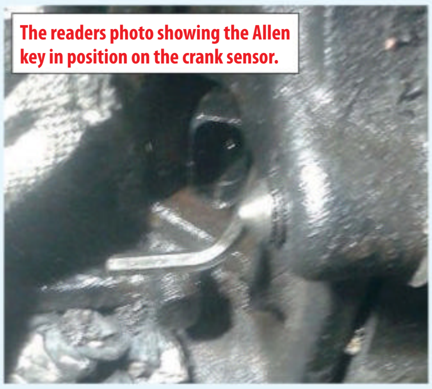
VOLKSWAGEN PASSAT

Awkward screw

Q I have just agreed to fit a crank sensor to a 2008 VW Passat diesel, but after finally getting to it, I am unable to remove the small 4mm Hex socket head due to 14 years of rust, which has corroded the socket head.

Due to that an Allen key starts to slip when trying to undo it. I have given it plenty of WD40, but to no avail. Do you have any thoughts on how to get this out? This would be a godsend VW should hang their heads in shame at fitting it in such a stupid place and being open to the elements.

Steven Tasker


The readers photo showing the Allen key in position on the crank sensor.

A Once the internal area of an Allen bolt has been compromised, then loosening it does become a challenge. One trick to loosening the thread of seized bolts is to firmly tap it with a hammer. This can shock the threads loose, and is quite effective.

The problem in your case now is that the grip of the Allen key has been compromised, and any effort in undoing the bolt is being transferred into a sheer force which is further damaging the internal area of the bolt.

When faced with this situation, my normal response would be to use a M4 or M5 multi-spline bit and hammer it into position in the Allen bolt. This I have normally found will grip tightly without spinning enabling the bolt to be removed.

The combination of hammering the bit in place, and the tight fit of the bit, will in most cases allow the removal. The downside of this procedure is that the bolt will then need to be replaced as it will not be reusable.

It is often the case though that the new crankshaft sensor is supplied complete with the replacement bolt, this will of course overcome this problem.

VOLKSWAGEN TOUAREG

Gearbox oil

Q I have been reading your publication since the 1970s, so I welcome your opinion on whether to change the gearbox oil on my 2012 VW Touareg V6 TDI 3.0-litre, which has covered 90,000 miles without problems.

I contacted a VW main agent to enquire about changing the oil in the eight-speed auto gearbox, to be told that the oil should not be changed. I was told this with my BMW E32 7-series but changed it anyway. Being an engineer, I am sure that the friction material and metal moving parts running in the oil will contaminate it.

Would you recommend changing the oil? If so, where are the drain and fill points? Also, which grade of oil and what quantity?

Thank you for your magazine.

Barry Tatlow

A Like yourself I do believe that the gearbox would benefit in the long run from having the transmission oil replaced. At the very least, some of the deposits which have accumulated at the base of the gearbox will be flushed from the system.

As the gearbox is not designed to be easily topped up, the job does have its difficulties. Like many now, the drain plug in the base of the sump of the gearbox has a level tube built into it. This means that first the level plug, and then the drain plug which has the level tube attached, need to be removed. You will also need a special tool VAS 6262 to refill the gearbox.

The initial fill of the gearbox is between 10 and 12 litres of ATF, but when draining and refilling only around 4 litres of fluid can be replaced. For this reason, it is often advised to carry out the process again after running the vehicle, to assist in removing as much of the old oil as possible.

Diagnosis equipment is also recommended to ensure that the gearbox oil is at the correct temperature when draining down. This should be below 45°C.

The process is as follows:

- **Jack up and support the vehicle ensuring it is level and there is sufficient working room underneath to carry out the operation.**
- **Remove the level plug and drain plug/tube assembly, allowing the oil to drain out into a suitable container for disposal. Refit the drain plug/level tube and, using the VAS 6262 tool, refill the gearbox with four litres of ATF (VW no G 055 540).**
- **Remove the VAS 6262 tool and fit the level plug. Start engine and allow to idle. While depressing the brake pedal, select each gear for a minimum of 10 seconds, then return the selector lever to 'N'.**

- **Run the engine at 2000rpm for at least 60 seconds, and return the selector to 'P'.**
- **Using the diagnostic equipment, ensure that the ATF temperature has reached 35°C, then remove the level plug. If ATF flows gently from the level hole, the level is correct. Remember some fluid will be held in the tube and this must be allowed for.**
- **If there is no fluid loss apparent then, using the VAS 6262 tool, add one litre at a time and repeat the process until ATF begins to flow gently from level hole.**
- **Refit the level plug using a new seal. The process must be completed with the temperature of the ATF below 40°C.**

VOLKSWAGEN BEETLE

Remote key-fob

Q I want to replace the three-button flip-type key-fob case for my 2003 VW Beetle 1.6 as the old one is a little tatty, although it works fine. I intend to swap over the key blade, immobiliser chip, circuit board and battery. My concern is how to handle the transponder chip: can moisture from your hands damage the chip, which may result in starting issues? Also, can removing and replacing the battery affect the alarm/central locking, for example, a loss of synchronisation that will need to be manually reprogrammed?

The reprogramming guide in the handbook is different to the instructions on owner's club forums. As I only have the one key-fob, I'm worried I will run into unnecessary problems just for appearance sake!

Gio Fusco

A The transponder chip should not get damaged by simply touching it – I have swapped quite a few over the years without any problems. However, disconnecting the fob battery for a short while may mean it will require synchronising. This is done as follows: press the remote lock or unlock button for approximately one second and then manually lock or unlock the vehicle within one minute. The key should now be synchronised.

If this doesn't work, then the programming procedure will need to be carried out. This requires two keys to be present as the ignition needs to be turned on and the vehicle locked manually at the same time. As you only have the one key the alternative is to use diagnostic equipment.

If you do obtain a second key, the procedure is as follows: turn on the ignition and use the key to be programmed to lock the vehicle manually, then press the lock or unlock button, wait for one second, then press the button again. The horn should sound, indicating that the programming is complete.

VOLKSWAGEN EOS

Driver's seat airbag

Q I've got stuck with a wiring problem on my wife's 2007 VW EOS 2.0 TFSI that I hope you might be able help with. Here is a summary of problem: Driving home the other night the airbag light came on. A quick bit of research showed the most likely issue was the connection under the driver's seat. A quick look under the seat shows that two of the wires coming from the seat harness have snapped off the connector, where the wiring harnesses for the seat connects back to the wiring from the car. I disconnected the battery as a precaution and attempted to unplug the airbag connection. At which point the last wire snapped off. Oh joy. This means I don't have a reference to work to when I make the repair.

I checked my service manual wiring diagrams, ELSAWIN, and found the 3-pin connector for the driver's seat, ref T3K which feeds N199. I noticed that the three wires feeding the 3-pin connector are Black, Blue and Brown. However, the wires that have snapped off the yellow connector from the seat wiring harness are White, Green and Brown and don't seem to be listed on the diagram. The connector, part number (8J0-972-576), also doesn't seem to have any pin numbers on it, which doesn't help. It seems that the connector is just an extension harness, as it feeds back into another yellow connector under the seat

I have found the following listed whilst doing some research that the wires should be connected as follows, but not sure if this is correct, and don't want to guess. I would assume that Brown always goes to Brown, so that leaves the White and Green wire to match Black/connector in the right order...

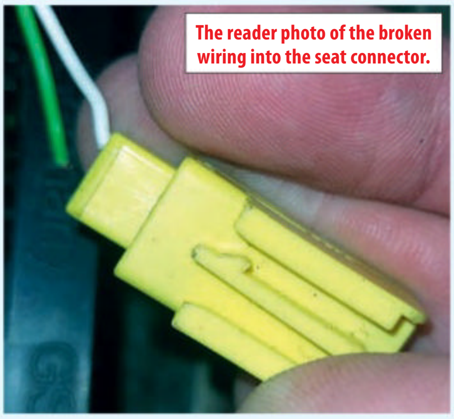
Brown > Brown > Blue > Green, Black > White.

My questions are:

1. Which wires should feed into which pins and match back to which wires from the main harness? For example, White wire from the seat harness goes into PIN X which is connected to wire colour X from the car harness
2. Can I just copy the passenger side?
3. Is there a reason why the White, Green and Brown wires aren't shown on the wiring diagram, have I missed something here? I would guess that as the wiring loom that connects to the car, and the 3-pin connector block is shown, this three wire section of loom (White, Green and Brown wires with different connectors on either end) is just extension lead of some sort and don't get listed/shown
4. I have ordered a new connector, wires and pins from VW, as the wires have snapped off and the pins are left in the connector and even with the lock tab removed, there doesn't seem to be an obvious way to de-pin the connector even when the locking tab is removed. Are these just disposable item and it's better to get a new one?

I hope this makes sense and provides enough information for you to advise on what wires to connect to which. If needed, please ask and I will provide any additional info. I must say reading/working with wiring diagrams isn't my strongest skill, so I might have just missed something, but any advice welcome.

Rob Slater



The reader photo of the broken wiring into the seat connector.

A The diagrams on ELSAWIN can be confusing, and the diagrams on my system do not appear to correspond to those you have. This can be very confusing, and the wires do change colour at the seat, which can confuse matters even more. The colours from the information I have should be matched as follows: Green–Black, Blue–White and Brown–Brown (this is a different shade and more of a dark orange).

The reason for the colour change at the seat is unclear and the wiring diagram does refer to the loom colours. I suspect that the seat wiring is controlled by the airbag supplier, and this can be subject to change, for this reason it is easier for VAG to simply ignore it.

It should though as you have suggested be possible to copy the passenger side as the diagrams I have do refer to both sides being equal.

As you have suggested it would be easier to replace the complete terminal block and if doing this, the actual pin numbers used will not make a difference as long as the colours are matched, but as you are coping the passenger side, this should be easily checked.

VOLKSWAGEN T4

Low on power

Q My brother-in-law's VW T4 Camper 1.9 TD with 68PS is painfully slow, especially on hills. I have suggested that fitting an intercooler before the air filter might help. Is this possible and would it give the engine a bit more grunt? If yes, which type would you recommend and where would you place it?

Ken Pugh

A Unfortunately, the 1.9 TD engine is not the biggest power provider and the 2.5 TDI five-cylinder engine was the one chosen for a more powerful vehicle. Although, in theory, an intercooler should increase boost by cooling the hot air, thus increasing its density and the volume of the air supplied to the engine. However, this will not increase power on its own, so you'll also have to adjust the fuelling. To gain extra power both the airflow and the fuel delivery need to be increased.

This starts to get complex and there are many options, such upgrades can be expensive. Most T4 enthusiasts recommend that the ECU should be remapped before moving on to any more involved adjustments. However, this should be done by a professional remapping company, not by purchasing a plug-in magic box from eBay.

VOLKSWAGEN GOLF

Failed wiper motor

Q The windscreen wiper spindles have seized on my 2004 VW Golf MkV wiper motor and I suspect this has burnt out the motor. The part number of the motor is 1K2 955 119B. I have tried fitting several replacement motors, but none have worked. I have also replaced the relay and ensured the bonnet is closed correctly when testing. Any suggestions?

David Rennie

A Having substituted more than one wiper motor without success, I suspect that the problem is due to damage to the power supply for the motor. The wiring diagram for the MkV indicates that the wiper motor is controlled via the body control module. There is a possibility that if the motor has burnt out due to having seize, then damage may have occurred to the body control module.

I am assuming you have checked the feed wires to the motor to ensure they are supplying voltage to the motor. If not, doing this would be worthwhile. There are also three fuses that should be checked in the engine compartment fusebox: fuses 31, 48 and 47 should all be inspected as one of these may have blown to protect the system. Using a VW scanner, it should also be possible to confirm if the BCM has failed.

VOLKSWAGEN FOX

Rattle from front of engine

Q I recently bought a 2007 VW Fox 1.2 and there is a rattling at the front end of the engine which I assume is the timing chain. I have been on the internet and it looks like this is a common problem with this vehicle. To change the timing chain, it says to remove the sump. Is this necessary or can it be done without removing it?

Pete Munday

A I am assuming that the engine fitted to your Fox is the BMD unit. In this case, the sump does need to be removed as you will need to detach the oil pump drive chain that sits in front of the timing chain. The camshaft and crankshaft bolts should also be renewed, so you will need to get the correct camshaft and crankshaft locking tools. The complete job has a book time of 3.1 hours and, as the sump is being removed, I would recommend making an engine oil and filter change at the same time.

To carry out the timing chain removal, first the timing chain cover, sump and oil pump chain need to be removed. The engine should then be set to TDC and the flywheel locking tool (T10121) and camshaft alignment tools (T10120) fitted into place. You will also need the camshaft sprocket holding tool (3036) and crankshaft pulley holding tool (3415). When removing the oil pump chain, you will need the holding tool (T10172) and holding tool pin (T10172/2). The timing chain tensioner should be reset by pushing it back into the housing and then locking it in position with tool T40011. The camshaft sprocket retaining bolt should then be slackened off to allow the sprocket to spin.

With the new chain fitted, ensure everything is aligned before tightening the camshaft sprocket up to 20Nm plus 90°. The timing chain tensioner should then be released and the crankshaft turned two revolutions before rechecking the timing. The crankshaft pulley bolt should be tightened to 90Nm plus 90°.

I then received this follow-up:

I have started working on changing the timing chain on my VW Fox. I am at the stage of removing the crankshaft pulley and the screw is really tight. Can you tell me if it's a right- or left-hand thread? How about the tensioning pulley?

I have got the crankshaft sensor out and put the timing tool in. The sensor was hell of a job to locate!

Pete Munday

The crankshaft pulley bolt and all of the associated bolts that need to be removed to complete the job are standard right-hand threads.

You say you have removed the crankshaft sensor and put in the timing tool. I am assuming this is the flywheel locking tool (T10121) and the camshaft alignment tool (T10120). The cam-chain tensioner will need to be reset and locked using a pin (T40011).

The camshaft sprocket bolt should be replaced and torqued to 20Nm + 90° when refitting. The crankshaft pulley bolt should also be replaced and tightened to 90Nm + 90°. After assembly, the engine should be turned over two revolutions by hand and the timing rechecked to ensure it is correct.

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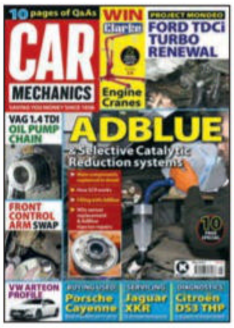

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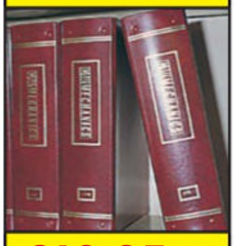

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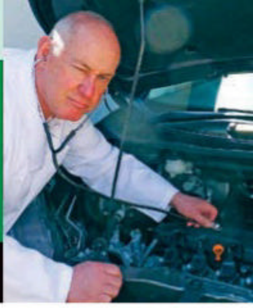

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BMW 5-SERIES

Misfire problem

Q I have a 2010 BMW 5-Series GT 550i, N63 engine. Thank you very much for your previous help with this car (which had a cold-start misfire problem). The car has provided trouble-free motoring until recently, as another misfire problem has come back to 'haunt' (45,500 miles). So, could I again ask for your opinion and help as to what could be causing this particular misfire? The engine starts and idles just fine but can now misfire under acceleration/load (even from low revs and light acceleration). My FCR reports codes like 140701/P0307; 140501; 140001.

All these misfires appear to be on the left/passenger side of engine 'V' (cylinders 5-to-8), so my guess was a fuel supply issue to that side. I replaced the left-side HP Fuel Pump (a new Metzger unit), but to no benefit or improvement. Given that previously the car had new injectors/plugs/coils (to solve the cold-start misfire), I'm at bit of a loss at what could be causing the misfire under acceleration.

Perhaps the ECU/DME has issues? But why is just the left/passenger-side affected only?

As always, very glad to hear your expert opinions/thoughts, thank you for the assistance.

Gerald Reeves

The BMW had the injectors replaced for a previous misfire problem.

A The fault codes you have retrieved do indicate that the injection electrical operation has been cut to cylinders 7 (code 140701) and 5 (code 140501). The third code (140001) does only indicate that the misfire has occurred on at least two cylinders – and so this would be a result of the previous codes. The code is triggered when several misfire events are detected within 200 revolutions of the crankshaft and the permitted number of misfire events will alter according to the speed and the load on the engine. This may explain why the codes come up under acceleration.

As the codes do indicate that the fault is due to an electrical/switching problem in the injectors, then this is unlikely to be a fuel pressure related fault. As the two injectors are on the same bank this may be either a problem within the loom or possibly a connection fault at the engine control unit.

I would start by inspecting the engine loom and the connections to the injectors. If this all appears to be in good order, then the next stage would be to remove and clean the multiplug on the engine control module. This may be giving a poor connection due to light corrosion.

If still nothing has been seen that could affect the operation of the injectors, then it may be an ECU problem and sending this for testing may be advisable.

HONDA ACCORD

O_2 sensor code

Q My 2005 Accord petrol 2.4 i-VTEC, after fifteen years in my ownership, has thrown up its first fault code. Just the one, P0138, O_2 sensor circuit high-voltage bank 1 sensor 2. Is this the upstream or downstream sensor? Is this likely to be a worn-out sensor or can other failures elsewhere flag up the same code? For instance, would a failing catalyst produce this code?

Gary Mills

A The code P0138 does as you have mentioned indicate Oxygen sensor (O2S) 2, bank 1 – high-voltage. This is possibly a short in the wiring to the sensor and this should be checked first. Even though this fault is though referring to the sensor positioned after the catalytic convertor, this is unlikely to be a failing catalyst as this would give a different code. It will either be an internal fault in the sensor or a problem with the feed/supply.

The tests to carry out are as follows:

- **With the connecting plug to the sensor disconnected check the resistance through the terminals 3 and 4 on the O_2 sensor side of the connector, these should be the Green & White/Black wires. The resistance should be 5-7Ω.**
- **The next check is to ensure the supply voltage is showing as battery voltage – to do this from the feed side of the plug, with the plug disconnected, place a probe between terminal 4 (Black/White wire) and earth. With the ignition on this should show battery voltage. Given the code, if the supply voltage is correct, then the most likely reason for the code will be the O_2 sensor itself.**

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DACIA DUSTER

EML & traction control

Q Our 2015 Dacia Duster 1.5 dCi 2WD has run very well for quite a while and (other than my fitting a new clutch recently) has given us few problems. Yesterday however, it did give us cause for concern.

During the first COVID lockdown we were fortunate to be able to spend much of the great weather on updating and restoring an old folding Rapido caravan. Since that time however it has stood unused so we decided that we should give it a trial and booked a couple of nights near Holy Island – about 80 miles from here.

As we live down a fairly steep farm track, towing the caravan (basically a trailer when folded) out was rather a challenge for the 2WD Duster – the wheels slipped on the loose gravel and the traction control light was showing for much of the way up until it finally slipped too much and stopped and needed help from neighbours, pushing behind to get us far enough to regain traction and get onto the main road. At this point all seemed fine and a little while later we set-off proper (in hot, dry weather).

The Dacia ran well, towing the trailer with no obvious problems at around 60mph for an hour (30 miles) but then, for no obvious reason and without warning, there was a judder and the EML came on red, together with the ESC/ESP light. At this point the car also began running very roughly – lacking power and running unevenly.

I managed to pull off the A1 into a car park and used my Autel MD808 scanner to check for codes. This resulted in one code – P0204 Injector Circuit/open cylinder 4, but nothing to suggest why the ESC light may be illuminated as well.

I cleared the code, and the car started well (with no dash lights) and ran reasonably well (though I believe it was slightly hesitant). However, after only a couple of miles on the A1, pulling the caravan up a slight incline, the lights reappeared, and the rough running resumed. At this point we decided to abandon the short break and try to get home.

After stopping and clearing the codes again, I left the scanner attached to the car and restarted. Again, the car ran better, though not really well for a couple of miles, but when we got to an incline, the car felt to be really struggling and often the EML and ESP or sometimes only the EML would illuminate, and the car would begin to run very badly. On some occasions the EML was orange, on others it was red. On a few occasions the engine would stutter, the EML would light and then it would immediately go out and the car continue its way.

With the help of my wife on the Autel, cancelling the codes if they appeared (OK I did have to turn the engine off and back on so the scanner would work in cancelling the codes), we managed to get home and got the caravan parked up.

The next day I decided to investigate the problem. The code had been cleared yesterday on our last hill, so I decided to take the car (without the caravan) for a drive to get the code/lights to return. I tried driving up hills in a high gear and I tried rapid acceleration, but no matter what I did, the car ran absolutely fine, and no EML/ESP lights came on and no codes appeared.

I tried checking the circuits and voltages at the number 4 injector (thinking this is the one on the left (o/s) of the engine from the front – away from the gearbox), using the number 3 as a comparator. Again, nothing amiss appeared. There was no obvious wiring damage either.

This leaves me totally baffled. The car currently seems to be running well and there are no codes or lights showing. I don't want to replace the number 4 injector 'just in case' as a new one seems to be at least £250, plus I would need various tools to remove the old injector and sealing ring, and seemingly a means to code a new injector to the car. I'm prepared to replace, if necessary, but only if it is the solution (our Dacia has done 93K miles and I suspect all injectors are original).

We were hoping to use the car to go to France in a few weeks' time, so this issue is causing us some concern.

Are you able to suggest any possible reasons for this strange situation and maybe ways in which I might get to the bottom of it? Also, if you do feel this is likely to be an injector issue, are there any reasonably priced coding tools available or should the car be taken to a garage for the coding to be carried out? Also, is it sensible to replace just one injector or, given their age, should they all be done at the same time?

John Bently

A The code P0204 is indicating an injector circuit malfunction, so whilst this may be an injector fault, it can equally be due to a wiring or connection issue and so it is not necessarily the injector at fault.

It is always difficult when the symptoms appear and then disappear again, and there are a number of possible scenarios that may explain the series of events.

If the problem was due to a poor connection or loose connector, it could then be the case that the checks you carried out, inspecting the wiring and connections have rectified the source of the problem. It may also be the case that the heat from the engine while it was working that little bit harder, was sufficient to allow a change in the connections that did cause the circuit malfunction.

It would be worth checking the main multiplug to the ECU, if this was not done in the previous checks, to ensure that it is clean dry and well connected.

If the problem is determined to be in the injector and this does need to be replaced, then a diagnostic system such as the RenCOM Advanced Renault/Dacia Diagnostic Package, available from Gendan.co.uk for £425 would be the ideal solution. This does though need to be used with a suitable laptop running Windows with a USB port.

The Foxwell NT520 Pro Full Systems - Renault/Dacia, does show some coding and is a lower cost option at £199. You would need to check the full range of this with Gendan on 01792 588002 and they will be able to confirm if this unit will code the injectors.

I would also consider looking at www.pfjones.co.uk for the replacement injector as they are reasonably priced.

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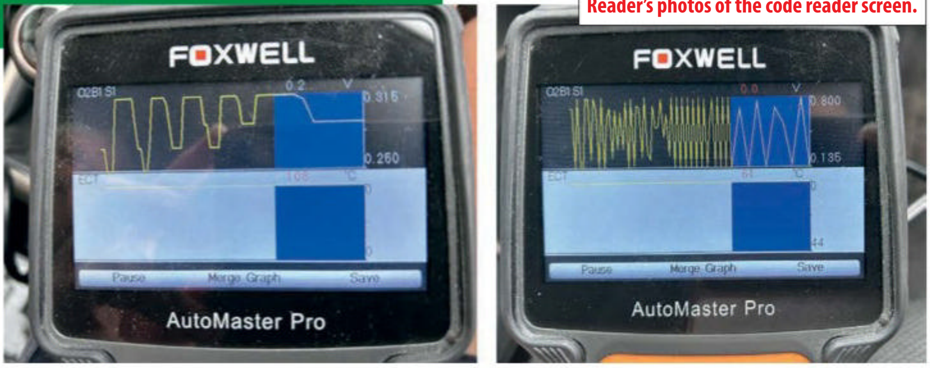
VAUXHALL ASTRA

Cold start problems



Reader's photos of the code reader screen.

Q I contacted you previously about my wife's 2005 Vauxhall Astra H 1.6 which had poor starting problems. I replaced the O2 sensor with one from Autovaux. The old one was stuck in, so I had to remove the exhaust manifold to get it out. This was refitted with all new gaskets, studs and nuts as stated in the Haynes manual. After the replacement, the car drives well and has given no issues with starting. After about a week of driving the engine management light came on and the code P0135 "O2 sensor heater circuit bank 1 sensor 1" was set again.

Whilst the engine was warmish, I cleared the code and monitored live data for the O2 sensors. The graph for the O2 sensor pre-cat had some reasonable gaps in the waveform so I wiggled various points on the loom. When wiggling the connector for thermostat heater control, the frequency of the spikes did seem to change but I could not get this to repeat with further wiggling.

With the engine cold, I rechecked the resistance in the wires for the thermostat heater control and O2 sensor – all fine. The thermostat heater control gave a resistance of 17.3. Is this correct/meaningful?

At this point I cleared the code. On starting the engine live data showed the performance of the O2 sensor was as expected and this remained the same after a drive. I ran the engine at a fast idle and monitored the engine coolant temp and O2 sensor performance. When the engine temperature got up to 108°C there was deterioration of the O2 sensor performance, and the fault code was set (see picture monitoring O2 sensor and ECT with ECT showing 108°C and deterioration in O2 sensor voltage).

Given the history with the thermostat heater control I disconnected it and started the engine, the performance of the O2 sensor remained poor and code P0135 returned. Unsurprisingly code P0597 "thermostat heater control circuit/open" was also present (and subsequently cleared).

When the engine had cooled down to about 35°C, live data showed that the O2 sensor was still reading a flat-line in voltage. This trend was the same in the morning when the temperature was back down to 21°C. Once again wiggling the wires by the thermostat heater control caused the O2 sensor voltage to change once but further wiggling of the wires could not get this to reoccur.

The battery was then disconnected, and resistance checks conducted on all wiring in the circuit including upstream O2 sensor and thermostat heater control. No issues were found.

When reassembled the O2 sensor performed well (see attached picture with coolant temperature at 61°C). Note that

JAGUAR X-TYPE

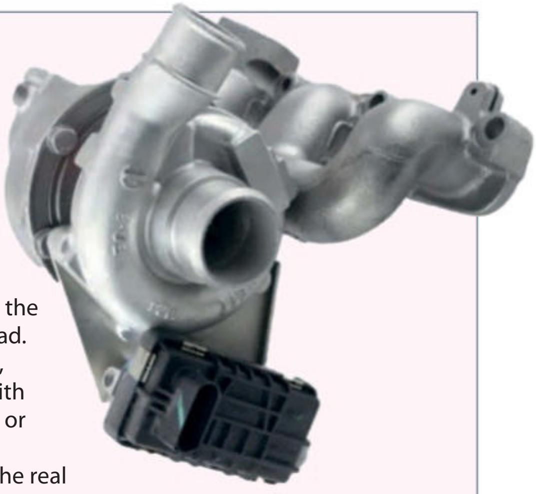
Sudden stop

Q You helped me some time back with my 2008 Jaguar X-TYPE 2.2 diesel with 172,000 miles on the clock. You kindly informed me reference the turbo issues to purchase "Revive turbo cleaner". I did purchase this and carried out the process in full, on all instructions to remove the carbon and soot. I have the fault remaining after this was applied, namely when under load. When you try to accelerate, the car nose dives and stops immediately – and the glow plug warning light comes on and stays on. If you throttle the engine when at idle say up to 4000rpm, there are no issues. This only occurs when under load.

We do not expect the fault to be turbo actuator as that kicks in when revving under idle, and also the turbo kicks in. The condition is dangerous for me, I can only use the vehicle with the present fault slowly, less than 40mph and by keeping the revs low. If I try and overtake or accelerate the car dies instantly. No black smoke at present after using the turbo cleaner.

Should I try and get to an independent Jaguar specialist with a rolling road and ask for the real time codes to identify the issue, or can you kindly make some suggestions please.

Chris Toomer



The possibility is that the turbo is locking up and acting like an exhaust brake.

A Loss of power would be bad enough but the severity of the situation which actually appears to be braking the engine and causing the Jaguar to nose dive does make the problem more complex. There are few things that can actually cause the engine to brake in such a manner and although you mention that the turbo does appear to be operating correctly, it may be the case that the impeller is locking up under certain conditions and this could cause the exhaust fumes to back up in the system and effectively brake the engine. This would give the sudden halt situation that you have.

I do think reading the codes would be the next step and this may help identify the source of the problem. If this is an overboost situation indicating a high-pressure in the induction system, this may be indicating a turbo problem, although often this is the result of a failed or failing actuator. It could also be the result of a failed impeller, and this should be examined.

I would hope that with the frequency of the problem using suitable equipment, the need of a rolling road would not be needed to obtain the data that would give information on the problem to allow the situation to be resolved.

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in the middle-ish of the screen I started running the engine at fast idle. At this time the car had a fault code for P0597 "thermostat heater control circuit/open".

I continued to run the engine at fast idle and when the temperature hit 95°C, the O_2 sensor flat-lined on the voltage. The fans kicked in at around this point, but I can't say if they were on before or after the code was set. The codes shown at this point were P0597 "thermostat heater control circuit/open", P0135 "O_2 sensor heater circuit bank 1 sensor 1" and U0009 "high speed CAN communication bus (-) shorted to bus (+)".

I waited a couple of hours for the engine to cool to 60°C. When started, the O_2 sensor still gave a flat-line on the voltage.

I disconnected the battery, waited 30 sec, then reconnected the battery and started the engine. When started the O_2 sensor still gave a flat-line on the voltage.

I disconnected the battery and checked resistance of the wires for the heater thermostat, no issues found. On restarting, the performance of the O_2 sensor had returned but after running for a short time the engine temperature reached 75°C and the reading from the sensor flat-lined again.

I have ordered a new Delphi replacement connector for the thermostat heater control and will splice this into the loom to see if it resolves the issue. If this fails to resolve the issue, then my next move would be to replace the thermostatic heater control on the basis of the high temp seen (108°C) and occasional fault codes in this area.

I would value your thoughts on whether this is an appropriate course of action or there are other items I need to rule out first. I realise that the thermostatic temperature control can be tested with more sophisticated diagnostic equipment so let me know if you think I should be taking the car to an auto-electrician at this point.

Ralph Gosden

A My first comment would be that the heater circuit in the O_2 sensor is only active when the engine is cold, the reason for the heater is to warm the sensor when cold to allow it to function earlier. Once the engine is up and running at a normal temperature, the heater on the O_2 sensor is no longer needed and will be switched off by the ECU. This will explain the loss of voltage you have seen at certain points.

However, the faults you have that are connected to the wiggling and manoeuvring of the engine wiring loom, do suggest a fault in the loom, even though this has not been detectable using a continuity tester.

If the fault were originating from a sensor or control unit, it is unlikely that the manoeuvring of the loom would result in the altering readings that you receive.

The code you have retrieved P0135 does indicate a circuit problem, and this can originate in the system wiring, the O_2 sensor or the engine control module, it can also be the referring to a zero-voltage supply.

This connected to the U0009 code which is also indicating a wiring fault would suggest that the wiring system does need checking at a professional level. As you have already checked the loom without discovering a problem at this stage I would either send the ECU off for testing to a company such as ecutesting.com or remanx.com to ensure that the ECU is not the source of the problem, or ask an auto-electrician to check the engine loom using an oscilloscope which will show up any CAN-bus faults.

VOLVO V70

Enhanced Traction System

Q I have a 1999 Volvo V70 2.4 petrol estate automatic and the ETS light is on. The engine is also running rough. Can you advise what I should check please?

Terry Burrell

A The ETS light is indicating a problem within the Enhanced Traction System, and this can be for a number of different reasons. As the engine is running rough, this may be the source of the problem, and it would be advisable to check out this fault first.

Your Volvo has a Diagnostic socket in the centre console just above the handbrake, and the first step would be to read the codes from the system using this socket.

It may be the case that the engine fault is the source of the problem, and this could be read using a simple code reader, but if the problem is in the ABS/ETS system, then it will need a diagnostic scanner that can read the codes from these systems.

As you kindly supplied the registration number, I can see that the vehicle is on SORN and has been off the road for over two years. It may be the case that the lack of use has contributed to the situation. You may find that on the drive to the MOT this situation could remedy itself as the systems relearn their parameters.

Diagnostics Doctor

Diagnostics Doctor is a **FREE** helpline service for *CM* readers – including trade readers – who are struggling with diagnostic/engine management related faults. **Steve Rothwell** will answer all your queries. He will need as much detail as possible: **MAKE**, **MODEL**, **YEAR**, **ENGINE CODE** and **NUMBERPLATE** of your vehicle – and the type of management system installed. Obviously, Steve will not be able to assess the vehicle up close, so his answer will be on the basis solely of your description. This is a FREE service and it may take some time to respond to certain problems. If you would like to receive a personal response via post, please enclose an SAE.

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Common abbreviations

ATS	Air Temperature Sensor
AFM	Air-Flow Meter – not a MAF type (see below). It could be, for example, a vane type
CAS	Crank Angle Sensor
CPS	Crank Position Sensor
CTS	Coolant Temperature Sensor
ECT	Engine Coolant Temperature
ECM	Electronic Control Module
ECU	Electronic Control Unit
EGR	Exhaust Gas Recirculation – meters exhaust gas back to the intake manifold
EML	Engine Management Light
EMS	Engine Management System
EPC	Electronic Power Control
FCR	Fault Code Reader
HT	High Tension – ignition output to the spark plugs
IAV	Idle Air Valve
ISCV	Idle Speed Control Valve – usually operated by a motor controlled by the ECU
LOS	Limited Operating Strategy – if the ECU detects a malfunction, it runs a programme to allow the car to still go, but at reduced efficiency
MAF	Mass Air-Flow meter
MAP	Manifold Air Pressure
MIL	Malfunction Indicator Lamp
PCV	Positive Crankcase Ventilation – takes crankcase gases and recycles back to the inlet system
TBPS	Turbo Boost Pressure Sensor – used by the ECU to regulate turbo output
TPS	Throttle Position Sensor
VSS	Vehicle Speed Sensor
WOT	Wide Open Throttle

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Electronic Diagnostics

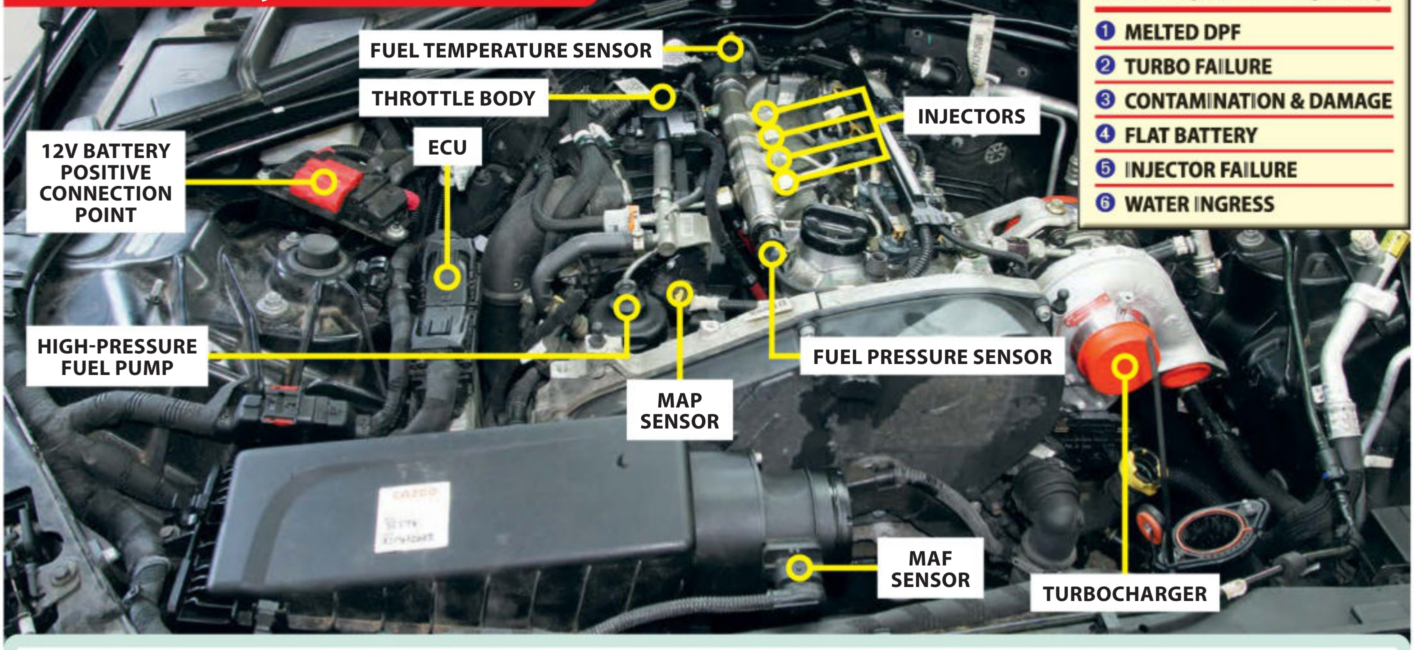
Alfa Romeo Giulia 2.2D

Tracing and fixing faults in electronic engine management systems

Rob Hawkins visits Italian car specialist Turin Motors of Leeds to follow them mopping up the mess on a 2018 Alfa Romeo Giulia after the engine oil had been over-filled.

“There’s nothing wrong with these engines,” remarks Chris Bradbury of Turin Motors as we look around the 2018 diesel engine, rear-wheel-drive Alfa Romeo Giulia seen here. One of the main problems concerning them is often down to the owner seeing a message appear on the dashboard with the instruction to change the engine oil. Chris recalls many a customer explaining that they thought this meant the engine oil needed topping up. And with a dipstick hidden away in the engine bay on pre-2019 models, and being part of the dashboard display thereafter, few owners double-check the oil level before pouring in lots of oil.

2143cc 4-cyl turbodiesel



TYPICAL FAULTS

1. MELTED DPF
2. TURBO FAILURE
3. CONTAMINATION & DAMAGE
4. FLAT BATTERY
5. INJECTOR FAILURE
6. WATER INGRESS

TECHNICAL SPECIFICATIONS

Engine	**2143**cc 4-cyl twin-cam turbocharged common-rail diesel
Engine oil grade	**0W-20** fully-synthetic
Oil classification	**Fiat** 9.55535-DSX (C2)
Oil capacity/schedule	**3.6** litres with filter every 12,000 miles or 12 months
Coolant	**Petronas** Paraflu Up (red)
Cooling system total capacity	**8/8.75** litres (manual/auto gearbox)
Brake fluid	**DOT 4** (Fiat 9.55597)
TORQUE SETTINGS	
Sump drain plug	**20**Nm (+/-2Nm)
Oil filter	**30**Nm (+/-3Nm)
Glow plugs	**18**Nm (+/-2Nm)
Crankshaft position sensor	**9**Nm
Camshaft position sensor	**9**Nm
Road wheels	**120**Nm (+/-12Nm)

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Whether it's a dead battery, flat tyre, or a mobile phone running out of charge, the V2200Air has you covered.

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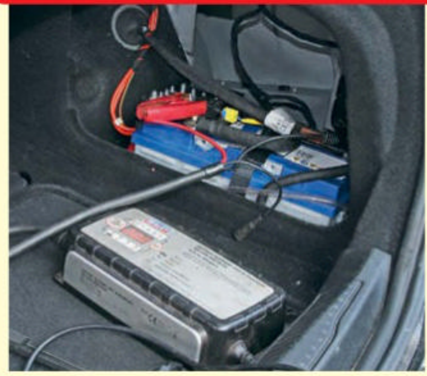
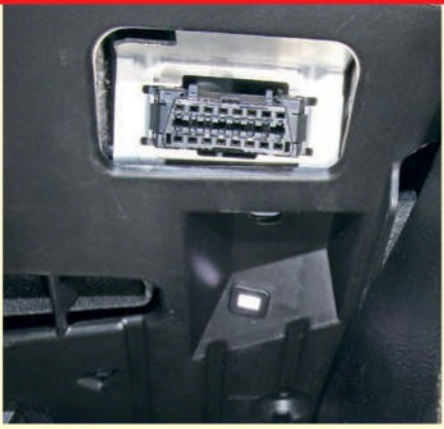
The engine only holds 3.6 litres, and there's a mere one litre between the minimum and maximum levels on the dipstick (if you can find it), so inevitably, the oil level becomes over-full and the problems we've outlined soon emerge, including oil ingestion, contamination and engine destruction.

The ability to communicate with the ECU on these Alfas is a little more restrictive on newer models, as Chris explains, "2019-on cars have a Secure Gateway (SGW) for the diagnostic connector. This is read only unless you have software capable of bypassing the SGW – most software doesn't have this." So, in most cases, a universal fault code reader won't be able to erase fault codes or even reset an oil service light.

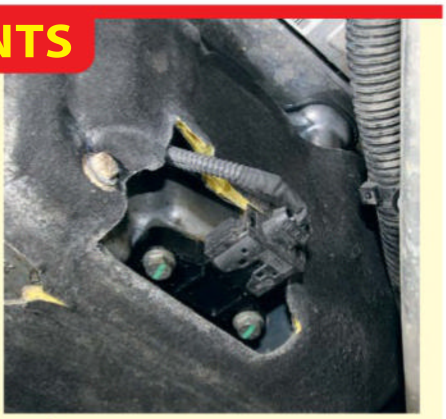
Typical ALFA ROMEO GIULIA COMPONENTS



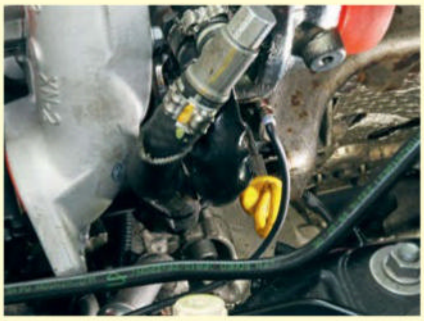
1 The 12V battery is located in the boot. It's worthwhile connecting a support pack to it to help to reduce the risk of voltage drops and anomalies when diagnosing faults with the ignition switched on.



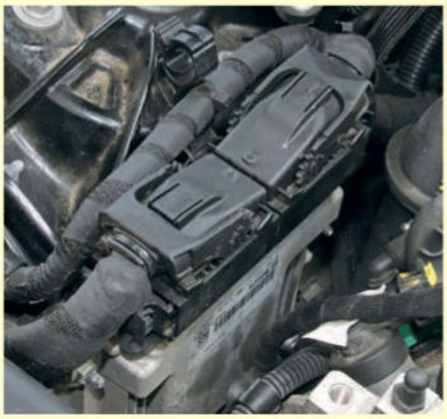
2 The EOBD port is located in the driver's footwell, underneath the outer edge of the dashboard.



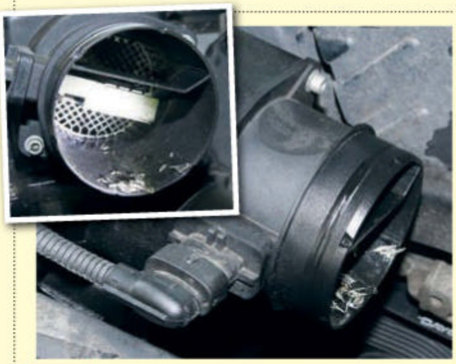
3 Underneath the engine bay, an oil level sensor is attached to the base of the sump. If the oil level is low, a message will be displayed on the dashboard, although this must not be confused with the oil change (service) message.



4 From 2019 onwards, the Giulia's diesel engine doesn't have a dipstick to check the oil level. Where a dipstick is fitted, it's difficult to access because it's located on the nearside of the engine, below the turbo and close to the DPF and exhaust manifold.



5 The ECU is positioned in the engine bay, close to the offside inner wing. Its connector plugs sit along the top edge.



6 The air filter housing is at the offside front of the engine bay, with a mass airflow (MAF) sensor fitted nearby in an induction pipe. On this vehicle, some of the turbocharger had made its way into here.

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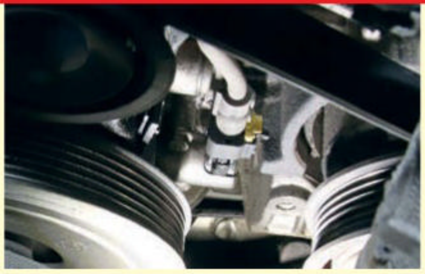
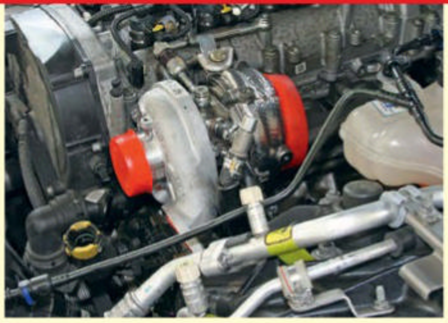
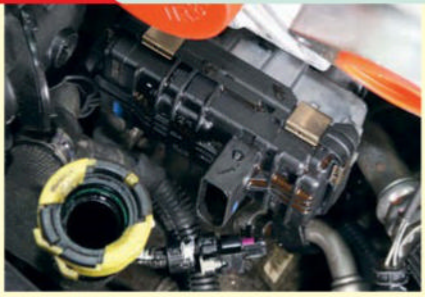
Typical ALFA ROMEO GIULIA COMPONENTS



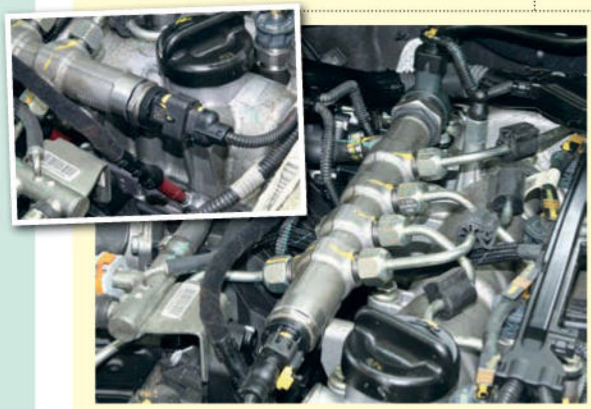
7 Lower down at the front of the engine bay, close to the front crankshaft pulley, there's a variable oil pressure sensor. Turin Motors explains that this engine uses it to control oil pressure and help improve engine efficiency at low engine rpm (at idle) when less oil pressure is required.



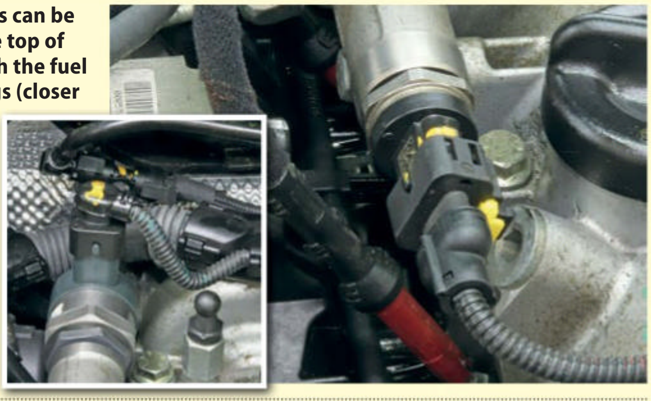
8 The turbocharger is on the offside of the engine. In this case, it had been replaced, so most of the components attached to it had been removed. See *Fault 2* for more information on typical turbo-related problems.



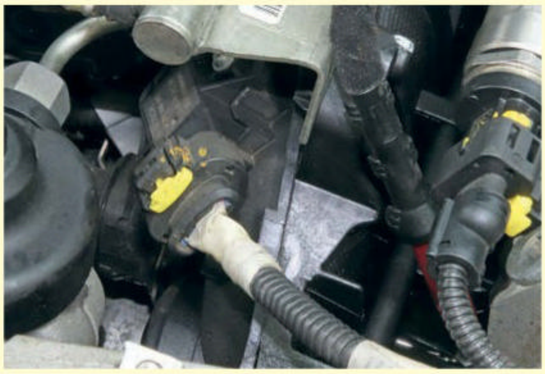
9 An electronic actuator sits underneath the turbo and can be viewed from the front of the engine bay. There should be more components fitted around it than our photograph shows, so it won't be quite so easy to see.



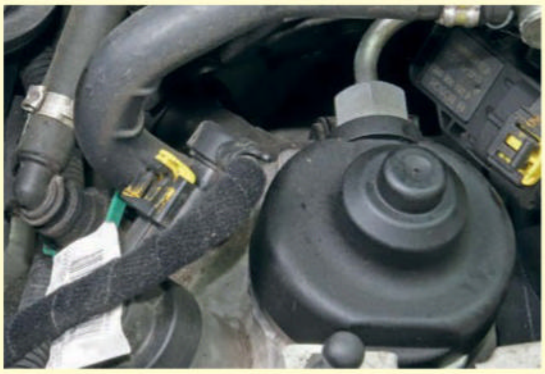
10 ◀ The injectors can be seen across the top of the engine, along with the fuel rail and the glow plugs (closer to the offside).



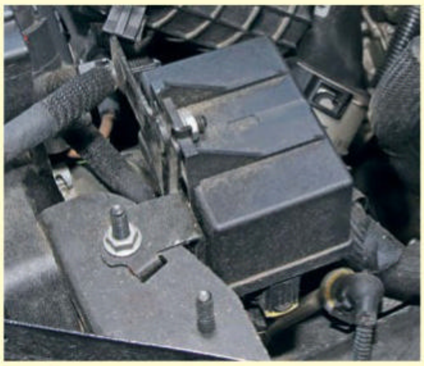
11 ▶ There's a fuel pressure sensor fitted to the frontmost end of the fuel rail and a fuel temperature sensor on the opposite (rearmost) end.



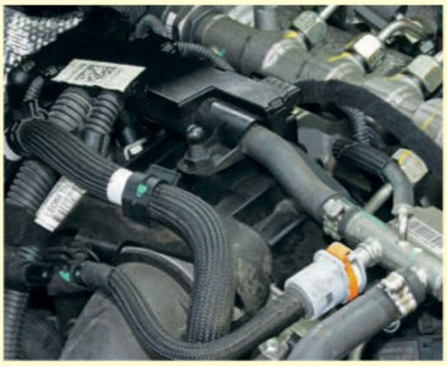
12 ◀ Close to the fuel pressure sensor mentioned in the last step, there's a Bosch manifold absolute pressure (MAP) sensor fitted to the inlet manifold.



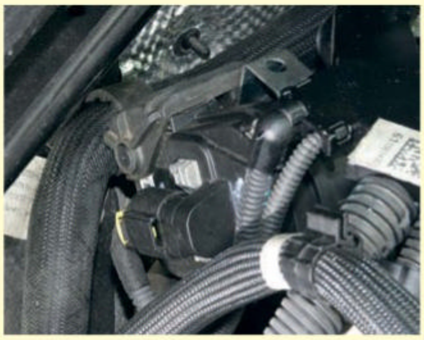
13 ▶ And to the offside of the MAP sensor, there's a high-pressure fuel pump with a connector plug and fuel lines attached to it.



14 In the nearside front corner of the engine bay, there's a control unit for the glow plugs, which looks like a small black plastic box secured with a nut at the top edge.



15 To the offside of the fuel rail, there's a throttle body that's attached to the inlet manifold. This helps to smooth out engine rpm during gearchanges.



16 To the rear of the throttle body, is this electronic component that's part of the EGR valve. The EGR valve is on the opposite side of the engine – look for a silver corrugated pipe.

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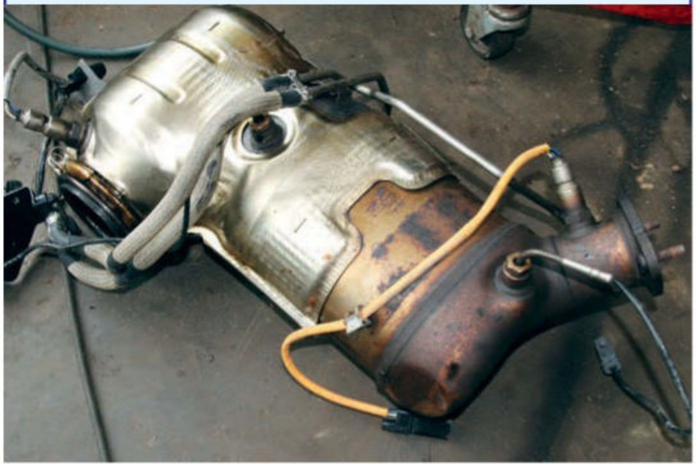
Typical ALFA ROMEO GIULIA FAULTS

FAULT 1

MELTED DPF

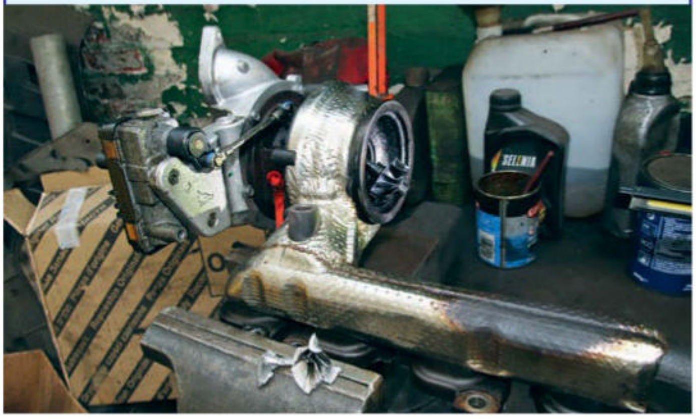
▶ Over-filling the engine oil can result in oil being drawn into the turbocharger (see the next fault) and forced out into the diesel particulate filter (DPF). When the oil gets into the DPF, it can mix with the soot inside it, creating a gloopy substance. When a DPF regeneration occurs, this gloopy substance becomes extremely hot and Turin Motors has found it can melt the DPF, making it scrap.



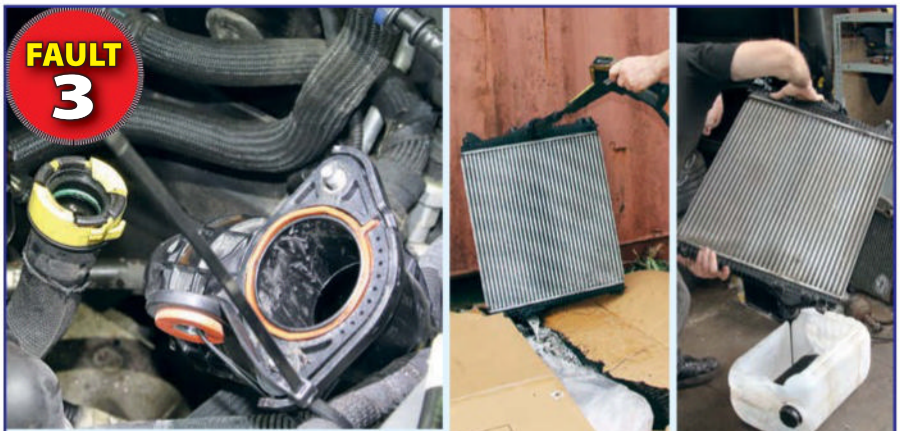
FAULT 2

TURBO FAILURE

▶ Another symptom of over-filling the engine oil is that the excess oil is ingested by the turbo, fed back into the engine and causes the engine to over-rev or at least hit the rev limiter. Switching off the engine deactivates the rev limiter, but the engine keeps running and at much higher revs, often destroying the turbo, like the one seen here where the main shaft had broken and bits of the impellors were scattered throughout the induction system. Budget for around £2000 for a new turbo. See our other faults for more potential problems to fix.



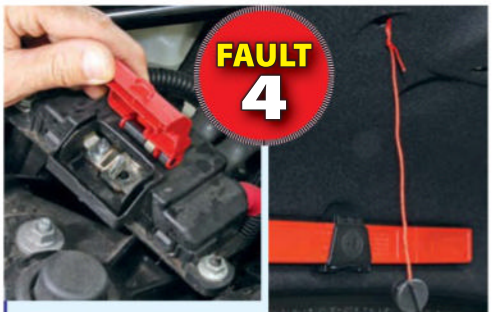
FAULT 3



CONTAMINATION & DAMAGE

▶ The previous problems caused by over-filling the engine oil will probably result in oil contamination of the intercooler, so it will need to be removed (the front bumper has to be removed first) and washed out – Turin Motors recommends only using hot water and no detergents or cleaning solutions in case they are flammable and get sucked into the engine. If the turbo fails and breaks up, then bits of it will probably be scattered around the induction system and could damage the inside of the plastic pipes, as shown here.

FAULT 4



FLAT BATTERY

▶ Should the battery go flat to the point that you cannot open the electronically operated boot to access it, then there is a positive connection point in the engine bay and an earth point nearby. If you are working on the vehicle and need to disconnect the battery, unscrew a plastic plug from inside the boot lid to unravel a length of string for the mechanical boot release. Stick the end of this to the outside of the boot so that if the boot lid is accidentally closed, it can still be opened.

FAULT 5

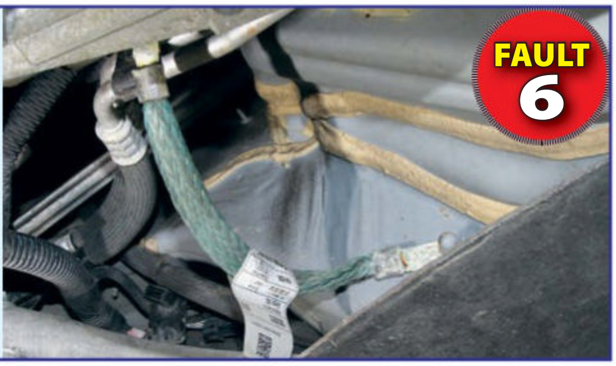
INJECTOR FAILURE

▶ Turin Motors has found that over-filling the engine oil can result in the injectors overheating and their tips falling off. Look for white exhaust smoke as an initial indication along with the relevant fault codes. The injectors can be tested. Budget for around £350 for a replacement injector.

FAULT 6

WATER INGRESS

▶ Turin Motors has found that water ingress in the wiring is one of the main causes of electrical faults. We found this green-looking earth strap on the underside of the engine bay, but water ingress problems are more hidden. TM says that if the electronic handbrake cannot be released, for example, then corrosion of the wiring to each rear caliper is often the problem.



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Mechanical Vehicle Inspections

FORENSIC
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Establishing the cause of a collision requires skill, and one possibility to consider is a defective vehicle. **Chris Randall** talks to an expert about what's involved in a vehicle inspection.

While always unpleasant, and with the potential for life-changing outcomes, the sad fact is that collisions are a part of motoring life. They have been since the very earliest days and, despite the best efforts of manufacturers and regulators alike, reducing their numbers is a frustratingly difficult business. That said, improvements have led to some success and the provisional results for 2023 show a 4% decline in fatalities compared to 2022 (although the overall numbers of those killed or seriously injured show little change and remain stubbornly high) with car occupant fatalities declining by 5% in the same period.

There's all manner of reasons why they happen, of course, and common causes include driver error and misjudgement, reckless driving or being behind the wheel while under the influence of drink or drugs and excessive or inappropriate speed. But there's another potential cause and that's a mechanical defect or failure affecting the vehicle, and that's where the experts at TRL (the Transport Research Laboratory based in Berkshire) enter the picture.

What we're exploring further here is the business of 'mechanical vehicle inspections' and to understand what's involved we called upon the expert skills of Technical Lead in forensic collision investigation at TRL, Craig Arnold. Before going any further it's worth pointing out a couple of things – firstly, that mechanical defects only account for around 5% of collisions, and secondly that his role is not just to establish whether a defect exists (even well-maintained cars can have something minor wrong with them) but whether a defect contributed to what happened.

As to the point at which people like Craig get involved, well that can happen very early on after a collision has taken place. "While it is sometimes the Police or legal representatives that call us in it's normally an insurance company, and there's often a time pressure. The high cost of storing a damaged car means they are often keen to move it on as soon as possible, so it's important that we carry out the inspection and record any evidence before a vehicle ends up being scrapped."

Closer examination

He tells us that the first step is ensuring that a vehicle is safe to inspect – something that's particularly relevant in the case of EVs – and then the main work begins with a broad assessment of the vehicle's exterior, looking for anything obvious that stands out. He'll then head a little deeper, making a closer examination of the areas that he says are the most likely to have been a contributory factor. "Tyres and brakes are where most problems are to be found, so that's generally what I'll focus on next. The important thing is being able to distinguish between normal levels of wear and tear – so unlikely to have been a cause – and things that go beyond that, which therefore require closer scrutiny." He adds that if a car is still driveable the Police routinely carry out a test for brake efficiency at the scene of serious collisions.

A basic inspection can take anything between a couple of hours and half a day, but it can be considerably longer if a defect is suspected of causing a collision. And make no mistake, things can get into forensic levels of detail in order to establish exactly what happened. Take the humble brake light bulb, for example. In a particular collision it may not be important if the brake lights were working or not at the time – hence the need to be able to filter out those things that won't be contributory factors – but if it is relevant then Craig and his team could examine the filament of the bulb under a microscope (this doesn't work for LED bulbs, obviously). How does this help? Well, if the light was illuminated then the filament gets hot, making it more likely to fail or distort in an impact, and hence establishing whether the brake lights were on (and therefore working correctly) or not at the time. Worth thinking about the next time you delay in getting that failed bulb replaced.

But there are some wider things that also have to be considered alongside a

physical inspection of a vehicle. Carrying out an HPI check is one, to ensure there's no history of crash damage lurking in a car's past and that may or may not have been repaired to the right standard, and the other is the MOT history. We've all become used to checking the online records before taking the plunge on a potential purchase, and while it can help us avoid buying a lemon it takes on a rather greater significance to people like Craig.

"It's an incredibly useful tool when it comes to building up a picture of a car's overall condition and ownership, especially if you delve further back into the MOT history. If, for example, I notice a list of advisories that have kept coming up over the years and centre around a particular mechanical area – the suspension, for example – then it will lead me to concentrate on those things as part of an investigation. They might turn out not to be a cause, but it will be obvious that a car has had problems in the past. But just because an investigation finds something that would cause a car to fail its test it doesn't mean that it caused or contributed to a crash. It's being able to determine the difference between those things that's key to what we do."

A part of this is also being able to determine whether a defect is old or more recent, and therefore a contributor to a collision. "There'll be an obvious difference between an advisory listed on an MOT almost a year ago and that wasn't attended to, and a component that has just failed. The presence of things like corrosion and dirt in a broken part will be the giveaways."

Even if an issue relating to the MOT is suspected it's not something that TRL will get involved in at an official level, although the Police may well want to follow it up with the garage concerned. As an aside, it does raise an interesting point around the subjectivity of MOT testing and cases where something is listed as an advisory one year but not the next, but that's something for another time. As is the question of whether we'll see a rise in mechanical defects contributing to collisions in the years to come as cost of living pressures tempt people into putting off routine maintenance and repairs.

One last question we asked was around vehicle recalls and whether they have an impact on things, and while Craig told us that he did check the DVSA database for the vehicle concerned and would establish whether it had been attended to it's not often something that appears to be a factor.

The fact that mechanical defects play such a small part in collisions is clearly good news, although there's no room for complacency. Ensuring that the vehicles you and I own are in sound, roadworthy condition remains vital and here at *CM* we've always been on hand to help with exactly that. But as diligent as most of us are it's good to know that organisations like TRL are on the case and working to help keep our roads a safer place.

NEXT MONTH

TIMING BELTS

- Why timing belts can be preferable to chains
- Belt system advantages and disadvantages examined
- Renewal intervals explains
- Auxiliary belts and water pump systems included
- Replacement parts advice
- How the DIY replacement procedure has changed
- An overview of special tools and why you need them

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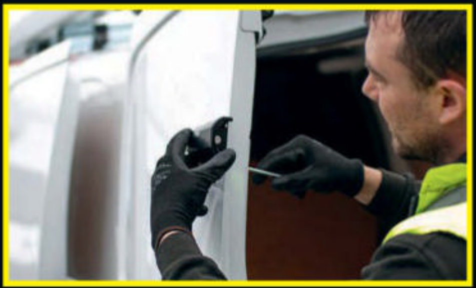

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Our Cars

Peter Clayton

Special Contributor

MINI revival

(Part 2)

febi were able to supply everything I needed for the overdue service.

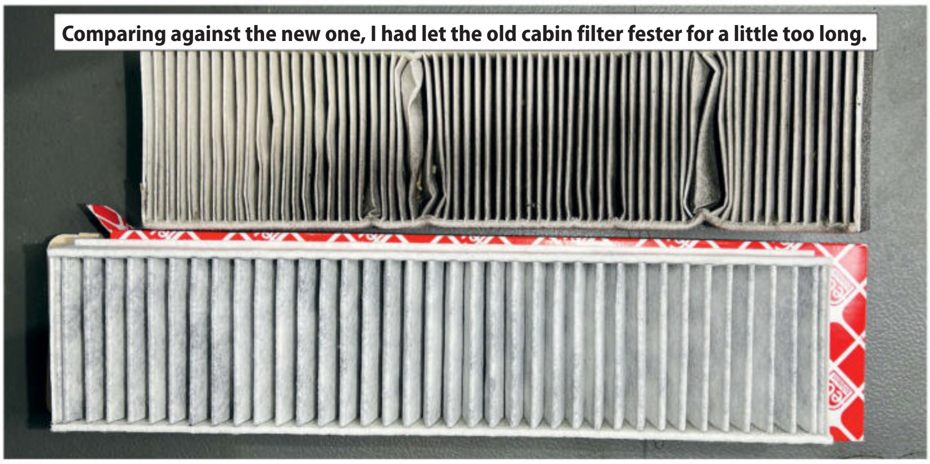
In my last instalment (*CM* Nov24), I managed to get my better-half's 2006 R50 MINI One Auto running again after a three-year hiatus (sat on our driveway). The basics were checked before moving the little hatchback into the garage for more work in preparation for its first road-going journey (to the MOT station).

Rear axle check

Back in the August 2021 issue of *CM*, I had competed the monumental task of revamping the MINI's entire front end subframe and suspension, treating it to the full works: newly painted and wax-injected subframe, control arms, bushes, steering rack and pump, hubs, bearings, springs and dampers, driveshafts, radiator and a/c condenser were all renewed. Yes, you could eat your dinner off it by the time I'd finished. It was my intention to then tackle the rear-end at some point in the future, but how bad had it really gotten?

With the car up on axle stands I began to strike various sections of the rear subframe with a small cross-pein hammer to assess its condition. At first glance it looked quite bad as the rust had formed layers which expanded over years of exposure to Scottish roads. Indeed, by the time I chipped away these layers to good metal I was left with a dustpan full of rot! I was relieved that I couldn't poke any holes through any of the load-bearing sections and the only real damage was a brake hose bracket which simply crumbled into dust. The kunifer brake lines, which replaced the steel versions years ago, were still holding up perfectly; the steel unions, however, were beginning to show their age. A good brush-down revealed they still had a bit of meat left on them so hopefully would see through another MOT.

With the rear subframe and connected components brushed down, I then began to dismantle the rear brakes. These ATE units are aluminium so didn't appear too bad at first glance. It was only when it came to removing the pads that the backings came free and so would not stay secure in position. Luckily febi were able to supply OE-quality replacements. The sprung clips on the backs just slide into the lip of the piston and were a doddle to install. The discs were nearly new, albeit really rusty, so I cleaned them up with some P120 abrasive paper and brake cleaner. I also seated the pads by pushing down on the brake pedal a few times, however something seemed off! The pedal kept sinking to the floor and I thought I had left a bleed screw undone or something… no: the rear nearside



Comparing against the new one, I had let the old cabin filter fester for a little too long.

Be sure to place plenty of rags around the oil filter housing when removing! It's also worth replacing the rubberised sump plug with a new one to maintain a good seal.

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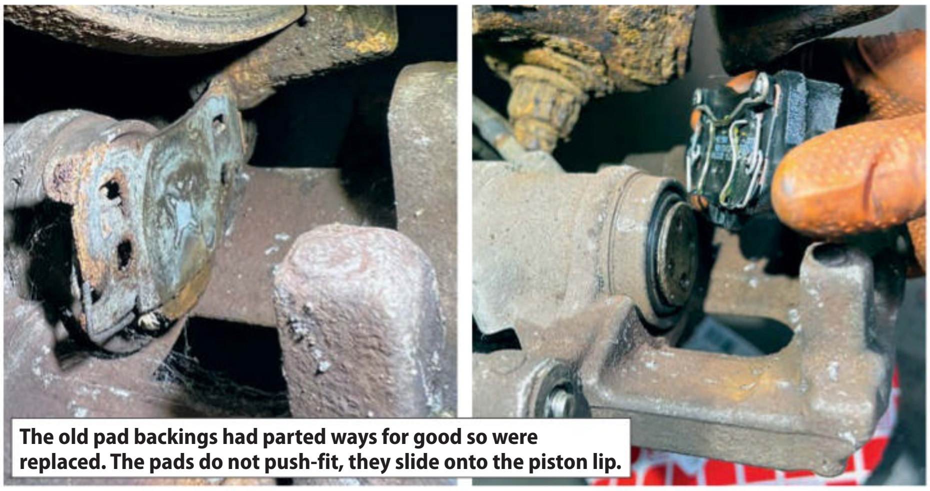
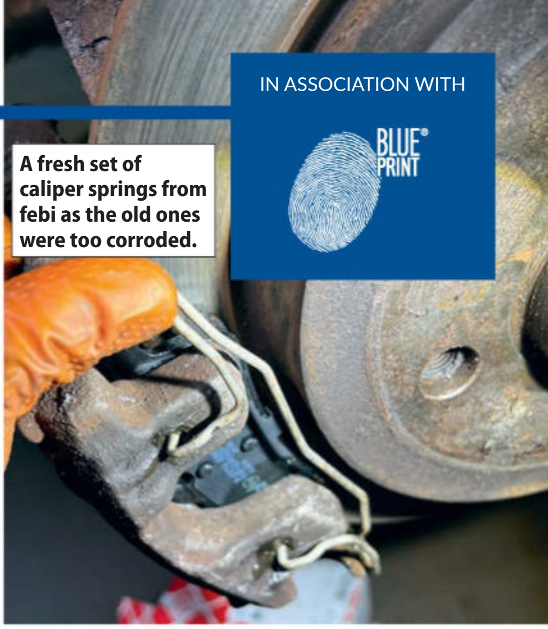


The old pad backings had parted ways for good so were replaced. The pads do not push-fit, they slide onto the piston lip.



A fresh set of caliper springs from febi as the old ones were too corroded.

brake caliper was not yet installed and by the time I had stopped to investigate the caliper cylinder was teetering on the brink of popping out! Of course, trying to get a brake winder tool on it was impossible as it was backed out so far. A lot of expletives and elbow grease later, I was able to manually push the cylinder back in whilst rotating it until it finally went home.

Overdue service

With a few items overdue having been out of action for so long, I thought best to get things back on track. Checking febi's online catalogue (partsfinder.bilsteingroup.com) I was able to order up the correct 5W-30 engine oil with filter, cabin filter, CHF11S PAS fluid to top up the steering reservoir and some DOT4 brake fluid to get the old stuff renewed.

Draining the engine oil went without issue, although I did forget how much mess is made on the R50 series engines when unscrewing the oil filter housing at the back of the engine. Oil will find its way on the exhaust manifold and then all over the subframe and steering components! A blast of brake cleaner soon sorted it out, which actually cleaned up the steering rack from a PAS leak I noticed earlier. The cabin filter replacement was just a case of unclipping a plastic cover under the glovebox and swapping the filters out.

The brake fluid change was next on my agenda. I figured with the amount of corrosion everywhere I would do a quick service of the bleed screws – I tend to do this every couple of years to avoid future problems. This simply involves holding down the brake pedal half-way through its travel with a depressor tool then removing each bleed screw to give it a good wire-brush clean. I had replaced the MINI originals a while back with stainless versions, but a hard layer of crud can still get trapped in the threads and can prevent the appropriate torque being applied to close the hydraulic system properly (or worst case you can snap your nipples off if corrosion gets the better of them!). After the clean-up it was then a case of following BMW workshop instructions setting up a brake bleeder kit to the reservoir placed under a pressure of two bars. I was happy to see that the old fluid wasn't black (which would indicate a significant breakdown of seals) but there was evidence of a very small amount of glitter, which I was a little wary of!

With the service items complete I ran the engine to get the new oil circulating, which gave me the opportunity to review the steering rack leak. No matter how hard I tried to manipulate the rack it remained bone dry! The pump sounded healthy too, so I topped up the fluid and would make a note to keep a close eye on it moving forward. I did notice that the air-conditioning seemed feeble, the PAS pump fan remained off and after a water temperature of over 90°C the coolant fan wasn't kicking in. Bypassing the relays as a test for the slow and fast speed brought the fan into life, so that's another thing I will have to investigate fixing in the next chapter!

While cleaning up the front brakes BMW state not to use physical abrasion on the pad contact points, however with the amount of corrosion here I did have to use a wire brush. The threads of the bleed screws were very crusty so chased them out for a smoother refit.

A dustpan full of rust was removed – will the MINI pass its MOT?

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Our Cars

Rob Hawkins
Special Contributor

Focusing on a Focus

Despite the numerous niggling problems, the 18-year-old Mk2 Focus flew through its MOT test in January 2024 after renewing a failed offside repeater bulb.

"It only cost me the price of a 12V battery," remarked Editor Martyn when he handed me the key fob and additional bonnet lock key to his 2006 Ford Focus Mk2 1.6 petrol. My potential daily runner for the next six months wasn't as bad as it sounds. OK, the offside front wing had lots of dings in it, but at least it wasn't rotten (many are). The driver's door mirror was missing a cover. The fuel filler flap was also missing. The bonnet lock that Martyn had replaced got damaged at the MOT test, so I had to fit another one. There was peeling lacquer on many areas of the exterior paintwork. The NSF wheel bearing made an unbearable droning sound when driving. A top-end rattle from the engine on start-up was a bit of a worry and the coolant temperature gauge never got as far as the normal reading. Inside the Focus, there were numerous niggles, such as the driver's electric window that wound down on the respective switch but wouldn't go back up – luckily it was discovered that by pressing the lock button on the key fob for a few seconds on this Titanium model, the window would return to the closed position.

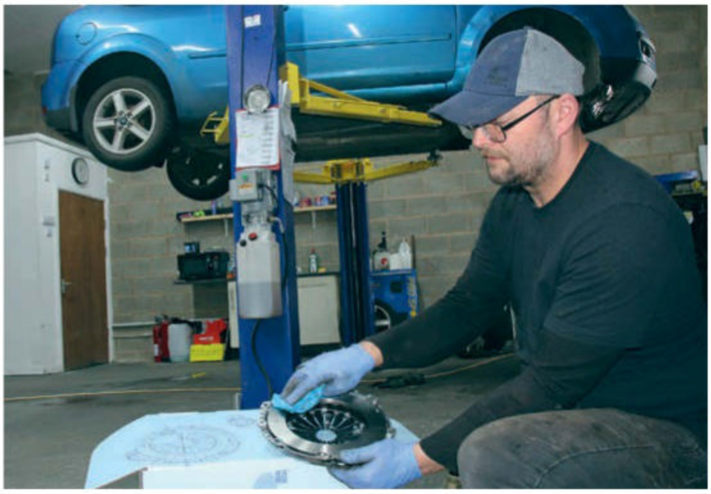
Other dilemmas inside included a broken gaiter around the gearstick, a loose centre console compartment and an aftermarket stereo that couldn't tune in to any radio stations.

For a bargain banger, I wasn't too concerned by any of the problems that had so far been identified. Martyn warned me that the clutch felt like it was on its last legs, and sure enough, it eventually slipped so much I struggled to drive up the mildest incline but managed to limp it to a local garage to have it fixed and featured in *Clutch Clinic* (see *CM* Aug 2024 issue).

The droning nearside front wheel bearing was soon fixed with a febi bilstein replacement (see *CM* Mar 2024 issue). The dinged offside front wing was replaced with a new pre-painted panel bought from eBay, in matching Aquarius Blue according to the car's paint code (see *CM* May 2024 issue). Had I realised that the entire offside of the car had been resprayed in a slightly different shade, then I would have been prepared to be disappointed once the replacement wing had been fitted. On reflection, there's no cheap solution. Sticking with the dented wing makes the car look tatty. Having a slightly mismatched but straight wing is my preference.

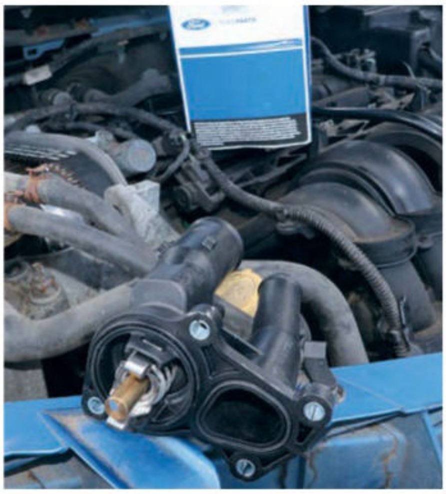
The troublesome driver's door window had me running around in circles for a few weeks figuring out, with the help of Mark Shipman at AES, the best way to fix the problem. It's all detailed in a separate feature, which resulted in the window regulator (motor and a control box) and the switch panel being replaced. Typically, nothing went to plan, but at least the window winds up and down now (see *CM* Oct 2024 issue).

Other jobs were much easier to fix. The missing fuel filler flap, for instance, which is a common issue on the Focus Mk2 models for falling off, was fixed in seconds with a colour-matched replacement that strangely looks a closer match than the wing, both of which are on the offside. The missing door mirror cover wasn't fixed by fitting a cover but changing the whole door mirror assembly.



◀ The original Ford clutch finally gave up at 122,000 miles. It slipped so much the Focus could barely climb a small incline. Luckily, it made it to a local garage where it was changed for a new Blue Print unit.

▶ A painfully expensive genuine Ford thermostat housing cost £180, but it fitted perfectly and solved the engine's cool running concerns.



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Used covers in the right colour are harder to find than complete door mirrors.

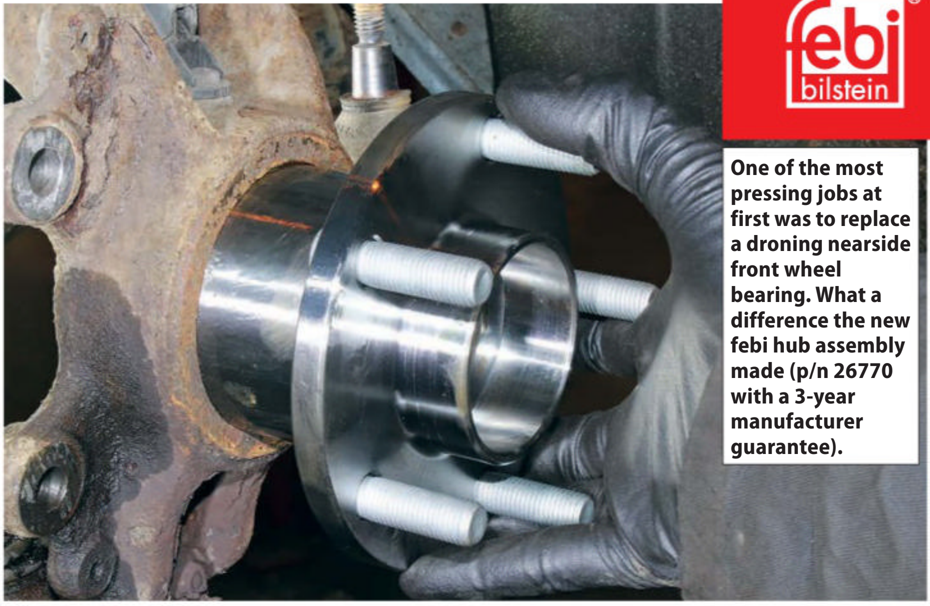
The peeling lacquer on the exterior paintwork isn't going to be so easy to fix. It's just about everywhere, especially on the bumpers, but where do you start and more importantly, where do you stop before the whole car has been painted?

That top-end rattle from the engine on start-up was worrying at first. Mark at AES recommended an engine flush and oil change to see if it made a difference. Martyn had read a few reports about the oil pick-up pipe causing momentary oil starvation on start-up. I tried an oil flush and fresh engine oil, but sadly it didn't fix the problem. Mark then suspected the adjustable camshaft pulleys were the problem, but with only Ford main dealer parts (at over £200) being available to fix it, everyone agreed it could be lived with, especially considering the rattle disappeared after starting the engine and wasn't doing any damage.

The cold engine coolant was initially a bit of a mystery. The reading on the gauge barely rose above the first mark when driving and only got to a quarter of the way across if the engine was left idling. We decided to take a look when it came to replacing the timing belt and water pump at AES, giving us the opportunity to see if a thermostat was present. It was present inside its plastic housing, but had fallen apart along with some of the insides of the housing it's secured to. Fitting a replacement wasn't so straightforward. An aftermarket housing wouldn't fit into the engine – part of the housing that locates the thermostat got in the way. Resorting to fitting a genuine Ford thermostat housing for £180 was the only solution we could find, which delayed the job. That meant me getting home from AES using public transport, which took an eye-watering three hours for a journey that only takes 50 minutes by car!

The only remaining hurdle with the timing belt change (see page 42 of this issue) concerned the fitting of two new auxiliary drive belts. These are known as stretch belts because there are no tensioners for them. Instead, they stretch over their respective pulleys and supposedly maintain tension. Sounds simple? If only fitting them was. Everyone at AES rolled their eyes at the thought, explaining that the official tools to help fit them rarely work, but pry bars do. And leaving the belts in direct sunlight for a few hours to warm them up and make them more pliable also helped.

Despite the numerous calamities with this Focus, nothing has stumped me for too long and whilst some parts have been more expensive than expected, nothing has been a deal breaker to warrant scrapping the vehicle. It's still on the road today at over 125,000 miles with its next MOT due mid-January.



One of the most pressing jobs at first was to replace a droning nearside front wheel bearing. What a difference the new febi hub assembly made (p/n 26770 with a 3-year manufacturer guarantee).

Martyn changed the bonnet lock, but it got accidentally damaged at the MOT test, so a complete replacement assembly was fitted soon after – febi sell these, look for p/n 192798.

The motor for the screenwash gave up at the same time as the clutch swap, so it was an easy job to cover.

Typical of many a Ford, the rear subframe looks like it was made of tree bark.

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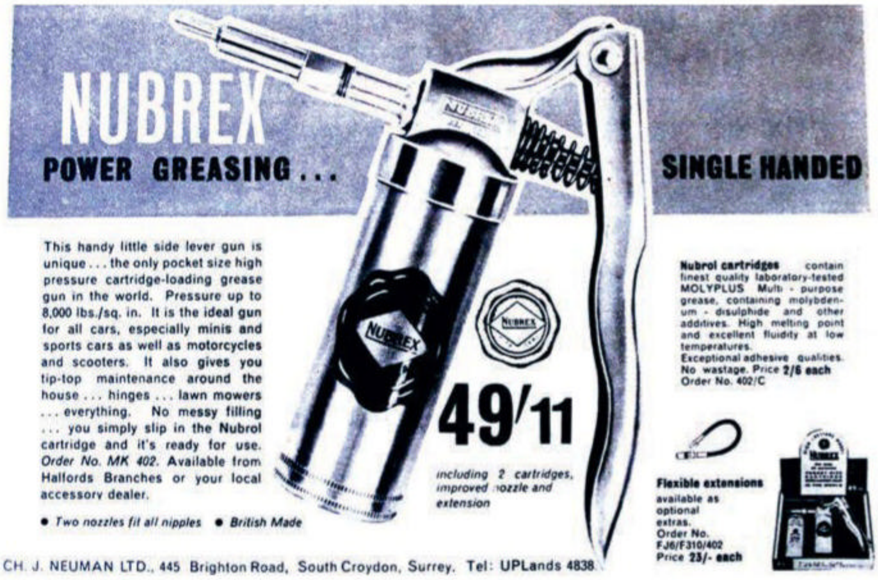
XMAS FUN

John Ward peeks at the motoring magazines going back to the 1960s, offering ideas as to what was on offer either as Christmas gifts or to make driving more bearable.



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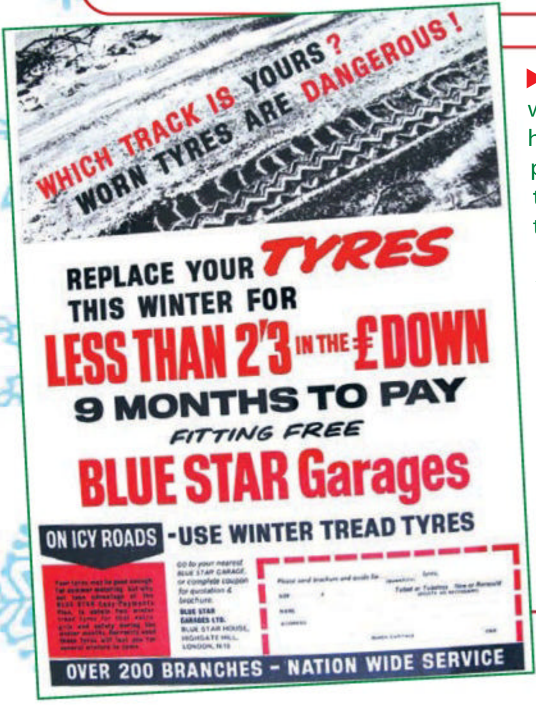
▶ Possibly we take so much for granted when driving today – but for those who liked to do their own repairs or servicing – or rather greasing which was back then a two-handed process usually, perhaps the single-handed use **Nubrex Grease Gun** may have appealed. This was British made item available from J Neuman Ltd., Brighton Road, South Croydon, Surrey and retailed at 49/11 (£2.50 now) that included two cartridges of grease with others available at 2/6 each (13 pence now) from Halfords and local accessory dealers.

I did see one not so long ago at an autojumble with its overall condition quite acceptable, more so considering how old it must have been.



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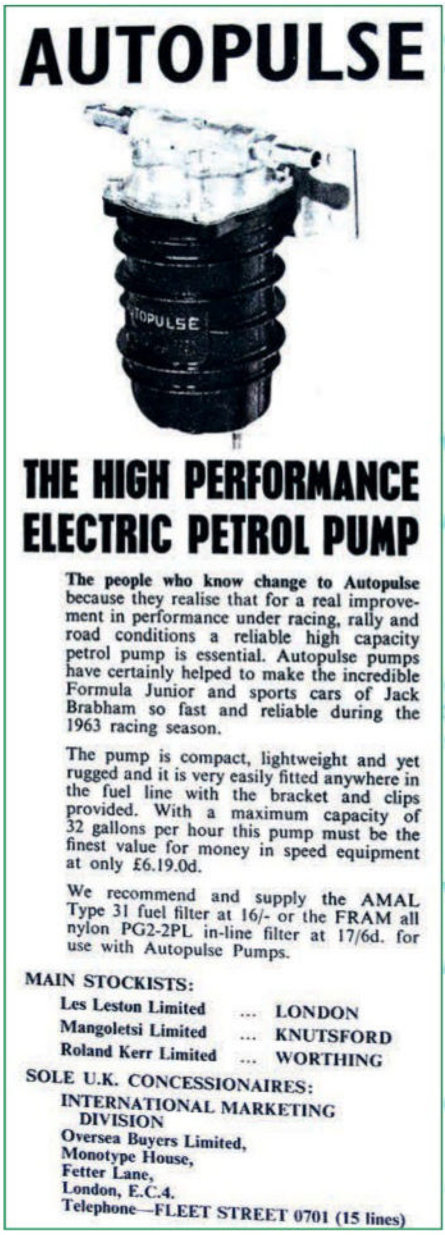
▶ Tyres play an important part in all weather conditions. Back in the same era, help was at hand for those motorists who possibly found things expensive – many tyre retailers, local and national, offered tyres and batteries on an 'easy terms' scheme. One such national company, with a quoted total of 200 branches was **Blue Star Garages** that ran a regular full-page magazine advert offering tyres at 'less than 23/3d (£1 today) in the pound down' as deposit with the balance to be paid over nine months.

The motorist then either popped into their local branch or cut-out and filled in a coupon from the magazine to post off asking for a quote based on the boxes filled in.



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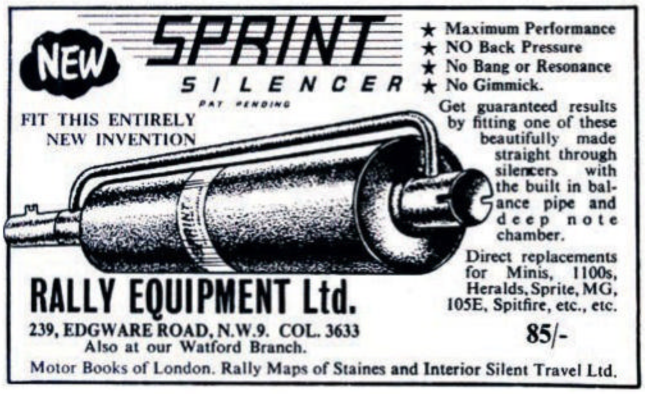
▶ The idea of a high-performance electric petrol pump might have also caught the eye of the budding driving enthusiast back then, although possibly aimed at the budding racing or rally driver of the day. The **Autopulse** Electric Pump was marketed by the UK Concessionaires International Marketing Division of Overseas Buyers Ltd., Fetter Lane, London EC4 – through three main stockists as listed in their advert and retailed at £6.19.0d (£6.95p today) – plus they listed recommended suitable fuel filters to match at assorted prices.

▶ Then the 'space-age' joy for the **Selectaride** shock absorbers that 'Adjust-As-You-Drive' to changing road conditions might have complimented the new set of tyres just fitted that was made and marketed by Armstrong Patents Co Ltd., Eastgate, Beverley, Yorkshire.

Apparently, the adjustments were controlled by a switch from the driver's seat, although in the description no prices are quoted. Possibly the cost related to whatever vehicle they were fitted to.



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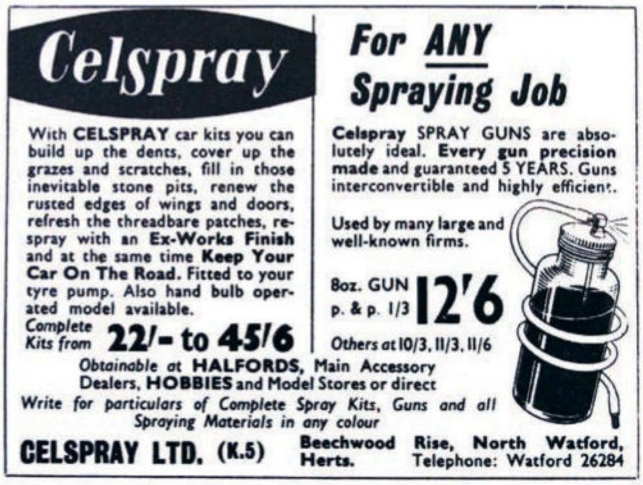
▶ The **Sprint Silencer** must have seemed 'hi-tech' in its day judging by the illustration, as it seems to have some sort of bypass smaller bore pipe attached to the main silencer itself, which must be the balance pipe as described in its advert. It boasted assorted merits of fitting one, plus quoted a range of models it fitted, that sold by Rally Equipment Ltd., Edgware Road, London NW9 for 85/- (£4.25 today) – but with no mention of nationwide dealers retailing. Although their Watford branch is quoted so possibly it was a direct purchase from them.



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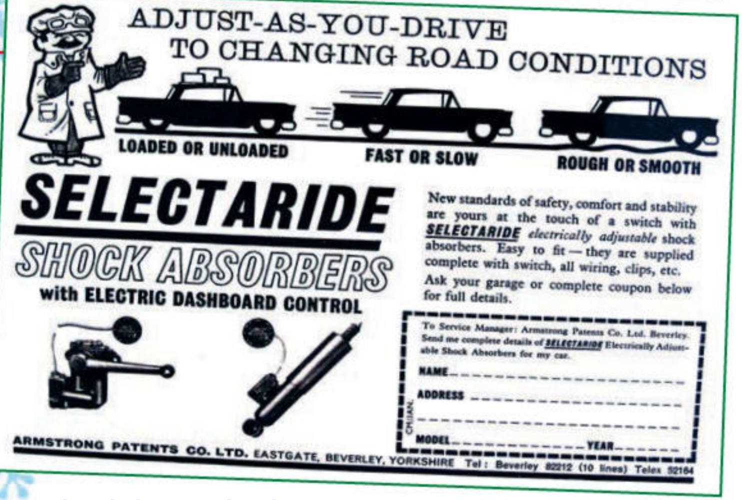
Obtainable at HALFORDS, Main Accessory Dealers, HOBBIES and Model Stores or direct

Write for particulars of Complete Spray Kits, Guns and all Spraying Materials in any colour

CELSPRAY LTD. (K.5) Beechwood Rise, North Watford, Herts. Telephone: Watford 26284

▶ For those adventurous types, the idea of spraying your car with the aid of a spray gun operated by a foot pump must have sounded ideal, not to mention cost-effective – although possibly also acted as a 'keep fit' device as well. Multitasking then? Celspray Ltd., Beechwood Rise, North Watford, Herts possibly had the answer to your prayers with their **Celspray** spray gun kits that ranged in price from 22/6 (£1.12p today) to 45/6 (£2.27p today) that was also guaranteed for five years and 'used by many large and well-known firms' it quotes in their advert. There was also a hand-operated bulb model on offer. All were available from Halfords and other motoring outlets.



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To Service Manager: Armstrong Patents Co. Ltd. Beverley.
Send me complete details of **SELECTARIDE** Electrically Adjustable Shock Absorbers for my car.
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ADDRESS _______________
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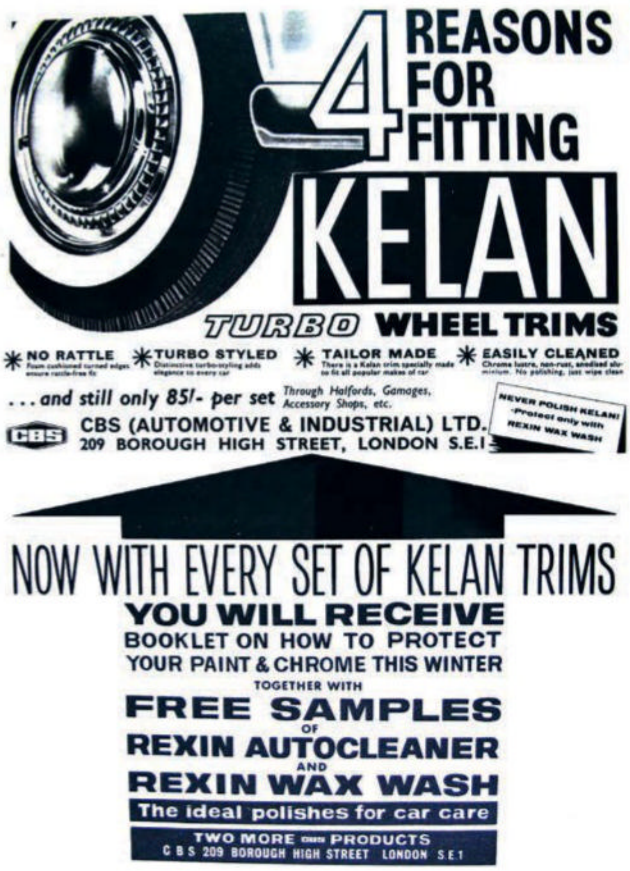
MODEL _______________ YEAR _______
CM.LIAN.

ARMSTRONG PATENTS CO. LTD. EASTGATE, BEVERLEY, YORKSHIRE Tel: Beverley 82212 (10 lines) Telex 52164



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✱ NO RATTLE Foam cushioned turned edges ensure rattle-free fit
✱ TURBO STYLED Distinctive turbo-styling adds elegance to every car
✱ TAILOR MADE There is a Kelan trim specially made to fit all popular makes of car
✱ EASILY CLEANED Chrome lustre, non-rust, anodised aluminium. No polishing, just wipe clean

. . . and still only 85/- per set Through Halfords, Gamages, Accessory Shops, etc.

NEVER POLISH KELAN! -Protect only with REXIN WAX WASH

CBS (AUTOMOTIVE & INDUSTRIAL) LTD.
209 BOROUGH HIGH STREET, LONDON S.E.1

NOW WITH EVERY SET OF KELAN TRIMS YOU WILL RECEIVE BOOKLET ON HOW TO PROTECT YOUR PAINT & CHROME THIS WINTER TOGETHER WITH FREE SAMPLES OF REXIN AUTOCLEANER AND REXIN WAX WASH

The ideal polishes for car care

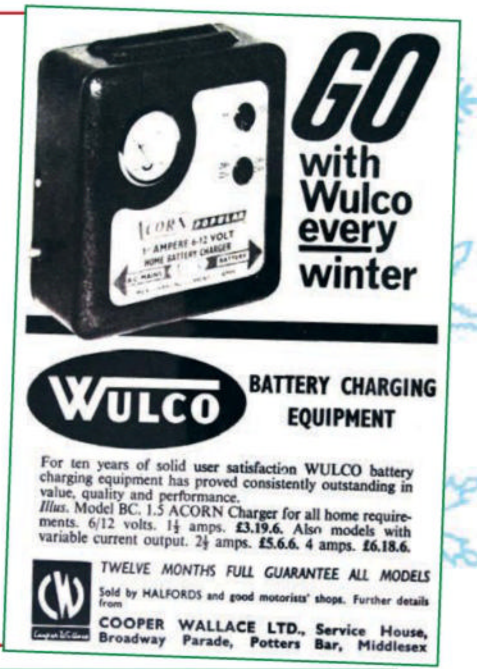
TWO MORE CBS PRODUCTS
C B S 209 BOROUGH HIGH STREET LONDON S.E.1

▶ There were problems with wheel trims rattling as one manufacturer took the challenge on by marketing the **Kelan Wheel Trims** sold by CBS Automotive & Industrial Ltd., Borough High Street, London SE1, that had features like non-rattle, turbo styled, tailor-made and also easy to clean apparently – and 'still only 85/- a set' (£4.25 today).

A set was available through Halfords and assorted suppliers – but also included in the deal was a booklet on how to protect your paintwork and chrome, plus samples of Rexin autocleaner and Rexin wax wash which seems to have been quite a bargain and stopped your trims from rattling, something I have never experienced.

▶ A battery charger would have been a handy asset to have, so perhaps a **Wulco** model might have caught your eye as it had assorted models with differing charging ampere rates that seems to be quite stylish in appearance.

These came from Cooper Wallace Ltd., Broadway Parade, Potters Bar, Middlesex, that retailed from £3.19.6 (£4 today) upwards depending on the chosen model and were sold by Halfords and good motorists' shops.



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Sold by HALFORDS and good motorists' shops. Further details from

COOPER WALLACE LTD., Service House, Broadway Parade, Potters Bar, Middlesex

So, there you have it – some of the possible presents that surprised many on opening their Christmas stocking decades ago. Do have a Happy Christmas and safe motoring

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CARS FOR SALE

MINI ONE. 2011. 58,000 miles. New MOT. 6-speed manual, climate control, daylight running lights, front fogs, mood lighting. Great condition inside and out, drives without fault. £150 annual road tax. Recently serviced. **£3500**. **07884 007482**. South East.

VAUXHALL CORSA. 2013. 122,000 miles. 1.3 Diesel Manual. Full Service History. Current MOT until next month but booked in for it's MOT, so will come with a full 12 months. Only 3 previous owners. Well looked after. Clean and tidy for its age, has a couple small scrapes and stonechips, nothing major or really noticeable. Alloy wheels, electric windows. Cruise control. Aircon. Drives very well with no mechanical issues. Everything works as it should. Spacious 4 door, very economical and only £35 a year tax. 2 keys. Any inspection or trial welcome. **£1695**. **07706 688799**, North West.

LAND ROVER DISCOVERY SPORT. 2015. 119,300 miles. 2.0 Diesel Automatic (Spares/Repair). Fix it up and potentially resell for a profit. Non-runner (requires engine replacement). MOT valid until: April 2025. HPI clear. 2 keys. Logbook available. Estate 7-seater with folding seats. Bodywork, interior, tyres and alloys in good condition. Engine abruptly stopped and won't start – bottom end is gone. It is an ideal candidate for someone interested in a repair project or who needs parts for another Discovery Sport. Please only make sensible offers within the price bracket. No time wasters! All information is listed. The buyer is responsible for towing the vehicle away or arranging for repairs at the Land Rover Specialist NG24 where it's currently parked. Vehicle is sold for spares or repairs. Returns are not accepted, and no warranty implied! If you have any questions, feel free to message me. Thanks for viewing. **£3500**. **07982 134602**. East Midlands.

JAGUAR XF. 2011. 44,000 miles. In excellent condition. Owned from new. It is a 3.0-litre diesel V6 Premium Luxury auto. It has Dove Grey leather interior, climate control, cruise control. 19in Caravela alloy wheels, speed limiter. Crystal Blue metallic paintwork and front parking aid with rear camera. It has been serviced annually, has no faults and has a current MOT. Please call for further details. **£8000**. **07977 979365**. Walsall.

VW TRANSPORTER. 2008. 120,000 miles. Twin-sliding doors. Excellent condition, most service history, 9-seats, tailgate. LWB. DAB, Bluetooth. CD player. **£7500**. **07973 832367**. West Midlands.

BMW 1-Series. 2012 with FSH. 116i. 1.6 petrol. 82,000 miles. Long MOT. 2 keys. This car has been maintained and looked after to a high standard. **£3390**. **078742 68077**. East Midlands.

PARTS FOR SALE

DUNLOP AGO/40 OPTICAL ALIGNMENT GAUGE. An old-school front wheel alignment gauge – no batteries or computers required. Suitable for cars, vans and trucks. Simple to use. In good condition and comes with full instructions. It will need to be collected. **£145**. **01752 771506**. Plymouth area.

BRAKE PADS & DISCS. 1 set of febi bilstien disc pads (part no. 16328). 1 pair of febi bilstien discs (part no 14404 – 256mm dia). These are for a multitude of VAG cars from Audi A1 to Volkswagen Golf including SEAT and Skoda cars. Both have been out of the box to check they're correct but otherwise as supplied. **£30**. **07941 525464**. Kent.

PORSCHE TYRE SAVERS. 8 pairs (for 2 cars), purchased from PCGB. 2 pairs are still in wrappers. **£90** to include postage or **£75** collected (6 miles SW of Bath). Call Mike or email: mikercarter@outlook.com. **07768 740929**. South West.

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In my Humble Opinion

Small manufacturers can sometimes have high hopes until reality dashes them. Mike Humble recalls the Naylor Car Co PLC – a marque that's sadly almost forgotten about.

Forgotten dreams – a lasting memory

Welcome to the Naylor Car Club

*"Harold Musgrove was a receptive listener, but my brother was a brilliant bullshi**er"*

▶ You know, it's rather sad to think just how many car manufacturers have come and gone since Karl Benz and Gottlieb Daimler rattled and clanked around the streets of Germany all those years ago. What's even sadder is if you ponder for a moment at how many names have faded into the books of history in the United Kingdom. Anyone reading this who has taken a wander around the Coventry transport museum timeline will be aware of how many manufacturers existed, not just nationwide, but in Coventry alone. Around the time of the outbreak of World War I, including motorcycles, there were more than fifty – yes fifty motor manufacturers. That's proper depressing stuff when you think. A fair bit of R&D work for Jaguar/Land Rover still goes on in Coventry, but as for vehicle manufacture, just one company builds vehicles – London taxis under Chinese ownership.

In more recent years we have seen the coming and going of some cracking little outfits such as Ginetta and Marcos building sporty or racing vehicles, only the former exists, however. One such long gone name that is virtually forgotten about these days, unless you are either old enough to remember or have a better than average knowledge of the motor industry is the Naylor Car Company. Steeped in motor sport history, Naylor created and launched their own take of the original 1953 MG TF two-seater. Company co-founder and chairman Alastair Naylor built up an enviable reputation for restoring and racing many MG 'T' type cars and came up with the idea of building a proper modern-day equivalent. With support from his brother David with engineer and journalist Alan Staniforth, the TF1700 was born.

Using a driveline consisting of leftover stock after the deletion of the Morris Ital using 1.7 O-series engines, gearboxes and rear axles modified to be located with coil rather than leaf springs, a prototype car was shown at the 1984 International Motor Show at the NEC. It's a car I remember very well as this was the very first time I visited the motor show (aged 12). I sat in the car on their tiny stand and to this day still have the brochure that Alastair gave me – who was to think back then that we were to become good friends, we kept in touch right up to the time of his death after a short illness in 2021. The Naylor TF1700 was lavishly trimmed, beautifully hand-crafted and simply gorgeous to look at and had full type-approval – and the Nationwide warranty backing of what was then over 1200 Austin Rover dealerships.

It was as close to a proper 'T' type MG as 1984 legislation would allow. It featured a backbone steel chassis, ash frame clad with steel panels and chrome-plated spoked wheels. A nod to its heritage but including modern advances such as rack-and-pinion steering, dual-circuit servo-assisted disc/drum brakes. Interior wise it was proper opulence with Connolly hide, Wilton carpeting and a wonderful rich burr walnut fascia. I fell in love with the little thing then, and I still dribble with admiration some forty years later. Brother David helps to keep the brand alive, and we too have become good friends partly due to sharing a keen interest in steam trains (he's a former board member of the North Yorkshire Moors Railway Trust) and owns four TF models including the first pre-production prototype that was originally owned by his late kid brother Alastair.

Sadly, it wasn't all plain sailing for Naylor. Despite huge interest at the '84 motor show, 1985 proved to be one of the wettest summers on record and sales were poor. Just 100 cars were produced by 1986 when they, as David rather eloquently put it; "we simply ran out of money". Also, the car was very expensive, for little more than an extra £40, you could get behind the wheel of a V8 Morgan and in my opinion, they perhaps built them too good. The West Yorkshire based company went under and all concerned were bought out by Maurice Hutson who ran the MahCon Group that went on to build another sixty or so cars now named as the Hutson 1700TF with the last one being assembled in 1991 with a handful of kit build units badged as Mahcon's.

Amazingly more than 90% of all the different variations still exist with some examples being as far afield as Australia. The brand runs a thriving owners club that does its utmost best to keep these glorious nuggets of British motoring history running with access to spare parts, club days and regular social meets. There is so much more fascinating history about the Naylor brothers and the cars that this page cannot begin to touch upon, but the car and the company in the wider range of automotive shenanigans is rather unfairly now forgotten or to many, just isn't known about. Catching up with David and one of his two sons at the recent NEC Classic Car Show was great. David, even though he is a great diplomat to the cause, is a plain-speaking kind of chap.

We both still miss the character that was Alastair, and I roared with laughter when I asked David how his brother managed to talk the then much feared director of Austin Rover – Harold Musgrove – into offering a full warranty for a car that at best, was only ever going to sell in modest numbers. With his broad toothy smile, he quipped; "Harold Musgrove was a most receptive listener, but my brother was a brilliant bullshi**er" – Alastair being responsible for the sales and marketing as well as partly engineering it too. Today, such an economic gamble simply wouldn't happen, but in the case of the little Naylor, I'm so glad it did.

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